Guide for Writing Techncial Documentation

Copernicus Land Monitoring Service

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1. Introduction

This manual guides users through creating technical documentation for the Copernicus Land Monitoring Service using **Quarto**. Quarto simplifies the process of writing professional documents in **Markdown**, and converting them into **HTML** and **PDF** for nice publishing. The manual covers basic Markdown writing, document rendering, as well a the review, and publication process of technical CLMS documents. It also describes the project folder structure, template usage, and common mistakes to avoid.

> ⓘ Note
>
> You don’t need to be a programmer nor an expert to use Quarto. If you’ve ever written a document in Microsoft Word, you’ll be able to use Quarto with a bit of practice.

2. Folder and File Structure

In this section, we explain how the documentation project is organized and where you should put your files. This structure helps keep everything clean, consistent, and easy to work with — especially when multiple people are involved.

Below is a typical folder layout for the project:

```
project-root-doc/
├── src/
│   ├── templates/
│   │   ├── CLMS_Template_ATBD.qmd
│   │   └── CLMS_Template_PUM.qmd
│   ├── styles/
│   │   ├── reference.docx
│   │   └── custom.scss
│   └── products/
│       ├── my-doc.qmd
│       └── my-doc-media
│           └── image1.png
├── scripts/
```

```
├─                                                                    macros/
└─ metadata/
```

2.1 Folder Descriptions

- **`src/`**
  This is the main source folder. It contains all the shared resources used when creating documentation.
  - **`src/templates/`**
    This is where you'll find ready-to-use `.qmd` templates. There are templates for two document types:
    - **ATBD** (Algorithm Theoretical Basis Document)
    - **PUM** (Product User Manual)
      When you start a new document, you will copy the appropriate template from here.
  - **`src/styles/`**
    This folder contains style-related files, such as DOCX templates and style sheets. These are used by scripts and macros to give your documents a consistent look.
  - **`src/products/`**
    This is the folder where you will actually create and edit your documentation.
    - For each new document, create a new `.qmd` file inside `src/products/`, for example: `my-doc.qmd`.
    - Also create a separate folder to store images and charts used in that document, for example: `my-doc-media/`.
    - Both the `.qmd` file and the media folder should follow a clear naming pattern (e.g. same prefix) to keep things organized.

      Example:

      ```
      products/
      ├─                                                                  my-doc.qmd
      └─                                                                  my-doc-media/
          └─ image1.png
      ```

- **`scripts/`**, **`macros/`**, and **`metadata/`**
  These folders support the automation workflow. They include scripts, macros, and configuration files that help with rendering and styling your documents.

By following this structure, everyone on the team will know exactly where to find templates, styles, and finished documents — and where to put new content.

3. Basic Markdown Syntax

> ⓘ Note

> In addition to this guide and the official documentation, you can also explore the template `.qmd` files in the `src/templates` folder. These files include real examples of how to structure documents using Markdown and Quarto-specific syntax. They're a great reference when you're not sure how to format something.

Markdown is a simple way to format text using plain characters — no need for complicated tools or buttons. Quarto uses Markdown to let you write clean, readable documents that can be turned into HTML or PDF automatically.

This section shows the most useful Markdown elements you'll need when writing documentation. If you want to explore more, visit the official Quarto Markdown guide.

3.1 Headings

Use the `#` symbol to create headings and organize your content. More `#` means a smaller heading level:

```
# Title (Level 1)
## Section (Level 2)
### Subsection (Level 3)
```

3.2 Paragraphs and Line Breaks

Just write text normally to create a paragraph. Leave an empty line between paragraphs.
To create a **line break** inside a paragraph, end the line with two spaces:

```
This is one line.
This is another line.
```

3.3 Bold and Italic Text

- *Italic* — use one asterisk or underscore: `*italic*` or `_italic_`
- **Bold** — use two asterisks: `**bold**`
- ***Bold and italic*** — use three asterisks: `***bold and italic***`

3.4 Lists

3.4.1 Bullet (Unordered) List

```
- Item one

- Item two

  - Subitem
```

3.4.2 Numbered (Ordered) List

```
1. First step
```

```
2.                                    Second                                    step

   1. Sub-step
```

> **Important**
>
> Make sure to include a blank line between list items, and ensure they are correctly indented. This ensures proper rendering in .docx and .pdf outputs. Without these, list entries may merge, misalign, or render incorrectly.

3.4.3 Paragraphs Within List Items

To include a paragraph or a block of text as part of a list item, indent the paragraph to match the indentation of the list content. Also, make sure the paragraph follows the list item without a blank line, or it may break the list.

```
-          This          is          the          list          item          title.

      This   is   a   paragraph   that   belongs   to   the   same   list   item.

   It  should  be  indented  to  align  with  the  start  of  "This  is  a  paragraph..."

-                                    Another                                    item

  With its own paragraph block.
```

3.4.4 Single-Item List Rendering Issue

When a list or sublist contains only one item, it can be incorrectly rendered in .docx or .pdf formats. In such cases, the item may appear in the wrong font or style.

To fix this, apply a custom style to the single list item. In the provided Word template, use the style named “NormalLine”.

Here is how to apply it:

```
-        step        1
    - [step 1.1]{custom-style="NormalLine"}\
```

> **Note**
>
> - The custom-style attribute ensures the correct formatting.
> - Don’t forget to include the backslash () at the end of the line to prevent unwanted spacing or breaks.

3.5 Links and Images

3.5.1 Link

```
[Quarto website](https://quarto.org)
```

3.5.2 Image

Place image files in your `media/` folder, and use:

```
![Alt text](media/image-name.png)
```

3.6 Code Blocks and Inline Code

3.6.1 Inline code

Use backticks (`) to highlight short code inside a sentence:

```
Use the `render` button to build your document.
```

Rendered result:

Use the `render` button to build your document.

3.6.2 Code block

Use triple backticks for larger code examples:

```
```python
print("Hello, world!")
```
```

Rendered result:

```
print("Hello, world!")
```

You can replace `python` with other languages like `bash`, `r`, or `json`.

3.7 Tables

Tables are a great way to present structured information. Below are two common ways to create them, along with rendered previews.

If you like there are several table generators on the internet which can help you generating markdown or html tables.

3.7.1 Simple (Pipe) Table

```
|    Name                        |    Role                        |    Status          |
|-----------:|------------|:--------:|
|     Alice                        |     Developer        |     *Active*            |
|    Bob                            |     Reviewer          |     **Pending**       |
: Demonstration of pipe table syntax
```

Rendered result:

Demonstration of pipe table syntax

Name	Role	Status
Alice	Developer	*Active*
Bob	Reviewer	**Pending**

Make sure to align columns using `|` and `-`.

3.7.2 HTML-style Table (for advanced layouts)

```
```{=html}
<table style="border-collapse: collapse; width: 100%; font-size: 14px;">
<thead style="background-color: #2c3e50; color: black;">
```
```

```
                                                                                <tr>
        <th colspan="3" style="padding: 10px; border: 1px solid #ccc; text-align:
center;">
                                                Document      Workflow      Overview
                                                                              </th>
                                                                              </tr>
                                                                               <tr>
                <th   style="padding:   8px;   border:   1px   solid   #ccc;">Step</th>
                <th   style="padding:   8px;   border:   1px   solid   #ccc;">Task</th>
               <th   style="padding:   8px;   border:   1px   solid   #ccc;">Details</th>
                                                                              </tr>
                                                                           </thead>
                      <tbody           style="background-color:           #ecf0f1;">
                                                                               <tr>
                  <td   style="padding:   8px;   border:   1px   solid   #ccc;">1</td>
        <td style="padding: 8px; border: 1px solid #ccc;">Initialize Project</td>
      <td style="padding: 8px; border: 1px solid #ccc;">Set up folder structure and
copy                                base                                  template</td>
                                                                              </tr>
                                                                               <tr>
                  <td   style="padding:   8px;   border:   1px   solid   #ccc;">2</td>
         <td colspan="2" style="padding: 8px; border: 1px solid #ccc;">Create and
configure                                `.qmd`                                file</td>
                                                                              </tr>
                                                                               <tr>
                  <td   style="padding:   8px;   border:   1px   solid   #ccc;">3</td>
           <td style="padding: 8px; border: 1px solid #ccc;">Write Content</td>
                     <td    style="padding:    8px;    border:    1px    solid    #ccc;">
                        Add   sections,   insert   media,   and   apply   styles.<br>
                           Use   templates   to   ensure   structure   consistency.
                                                                              </td>
                                                                              </tr>
                                                                               <tr>
                  <td   style="padding:   8px;   border:   1px   solid   #ccc;">4</td>
           <td style="padding: 8px; border: 1px solid #ccc;">Render Output</td>
                     <td    style="padding:    8px;    border:    1px    solid    #ccc;">
                                <ul    style="margin:    0;    padding-left:    20px;">
                                                   <li>HTML     for     preview</li>
                                          <li>DOCX    for    formatting    check</li>
                                                  <li>PDF     via     automation</li>
                                                                              </ul>
                                                                              </td>
                                                                              </tr>
                                                                               <tr>
      <td colspan="3" style="padding: 8px; border: 1px solid #ccc; background-color:
#d1ecf1;                              text-align:                            center;">
                      □   All   steps   completed   —   document   ready   for   review
                                                                              </td>
                                                                              </tr>
                                                                           </tbody>
</table>
```

Rendered result:

Document Workflow Overview		
Step	**Task**	**Details**
1	Initialize Project	Set up folder structure and copy base template
2	Create and configure `.qmd` file	

Document Workflow Overview		
Step	**Task**	**Details**
3	Write Content	Add sections, insert media, and apply styles. Use templates to ensure structure consistency.
4	Render Output	• HTML for preview • DOCX for formatting check • PDF via automation
✅ All steps completed — document ready for review		

⚠ Warning

Avoid using **nested tables** (a table inside another table) when writing documentation intended for DOCX or PDF output. While this might work in HTML, it often causes serious rendering problems in Word or during PDF conversion — such as layout breakage, invisible borders, or unreadable formatting.

✅ Instead of nesting:

- Reorganize the content into a simpler layout
- Split one large complex table into two or more smaller tables placed one after another

This ensures your document remains clean, readable, and properly formatted across all output formats.

3.8 Figures (with captions and layout)

You can add figures using this special block format:

```
::: {.figure}
![A helpful diagram](media/diagram.png)
A short caption for the figure.
:::
```

You can also use layout options, like `fig-align="center"` or `fig-width="80%"` in advanced cases.
More: https://quarto.org/docs/authoring/figures.html

3.9 Showing Images in Multiple Columns or Rows

Sometimes you want to display a group of images side by side or in a grid. This is useful for comparisons or visual overviews. The following approaches work well in both HTML and DOCX outputs, including when converting to PDF.

3.9.1 Without Captions

You can use a Markdown table to arrange images in multiple columns and rows:

```
| ![](image1.png){width=120} | ![](image2.png){width=120} | ![](image3.png){width=120}
|
|----------------------------|----------------------------|----------------------------
-|
| ![](image4.png){width=120} | ![](image5.png){width=120} | ![](image6.png){width=120}
|
```

This creates two rows with three images each. Adjust the width as needed to fit your layout.

3.9.2 With Captions

To add captions under each image, simply include a row of text below each row of images:

```
|  ![](img1.png){width=120}  |  ![](img2.png){width=120}  |  ![](img3.png){width=120}  |
|:--------------------------:|:--------------------------:|:--------------------------:|
| Caption 1                  | Caption 2                  | Caption 3                  |
|  ![](img4.png){width=120}  |  ![](img5.png){width=120}  |  ![](img6.png){width=120}  |
| Caption 4                  | Caption 5                  | Caption 6                  |
```

This method keeps captions aligned with each image, and works across all output formats.

> ⚠ **Note:** Tables used for captions will show borders in DOCX and PDF outputs. Removing them requires custom styles in a reference DOCX.

3.10 Page Breaks for .docx/.pdf Outputs

In Quarto, using section breaks (like - - -) may not reliably produce a page break in .docx or .pdf outputs. Instead, to insert a page break that appears only in those formats, use the following block: that appears only in .docx or .pdf outputs, use the following block:

```
::: {.content-visible format=docx}
```{=openxml}
<w:p><w:r><w:br w:type="page"/></w:r></w:p>
:::
```

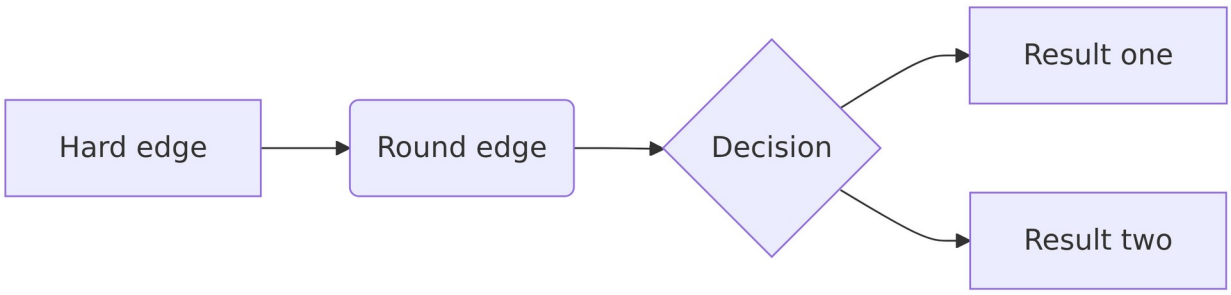
This will ensure that the page break is included in the rendered Word or PDF document, but not visible in HTML or other formats.

3.11 Equations

Quarto supports mathematical equations using LaTeX-style syntax. You can add inline equations or display equations as blocks.

3.11.1 Inline Equations

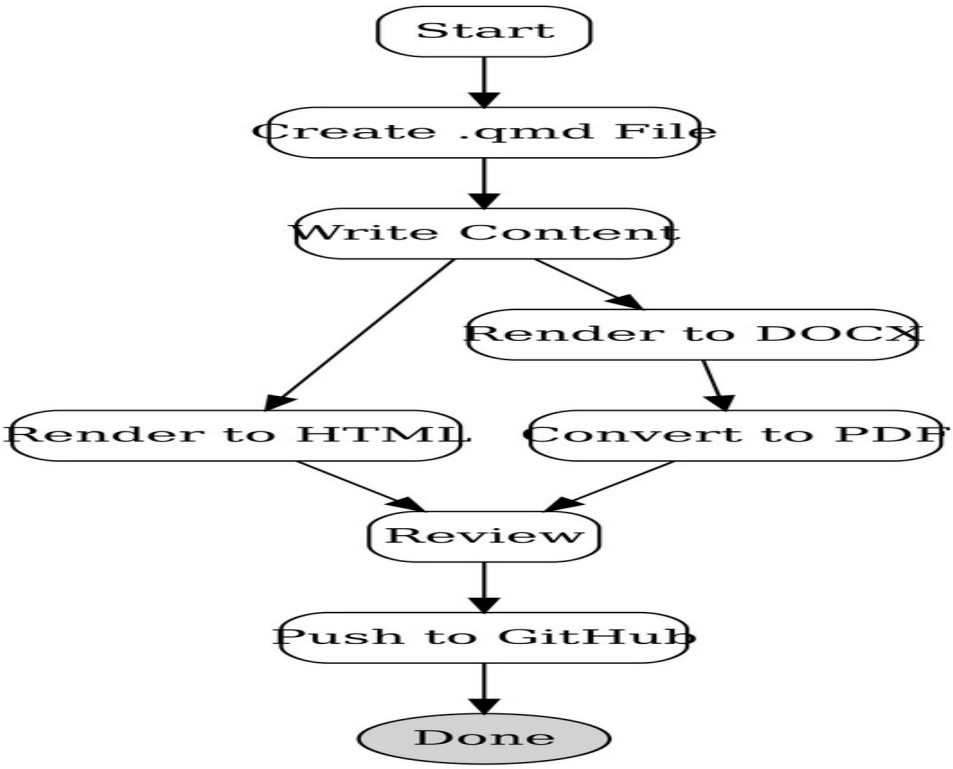
Use single dollar signs `$...$` for inline math:

```
The formula for the area is $A = \pi r^2$.
```
```

Rendered result:

The formula for the area is .

3.11.2 Display Equations

Use double dollar signs `$$...$$` to show a larger, centered equation block:

```
$$
E = mc^2
$$
```

Rendered result:

You can use most standard LaTeX math symbols and operators. For more examples, check the Quarto math documentation.

3.12 Diagrams

Quarto supports diagrams using **mermaid** and **dot**. Just use a code block like this:

3.12.1 Mermaid example

```
```{mermaid}
flowchart LR
A[Hard edge] --> B(Round edge)
B --> C{Decision}
C --> D[Result one]
C --> E[Result two]
```
```



3.12.2 Dot example

```
```{dot}
digraph DocumentationWorkflow {
node [shape=box, style=rounded]

Start -> "Create .qmd File"
"Create .qmd File" -> "Write Content"
"Write Content" -> "Render to HTML"
"Write Content" -> "Render to DOCX"
```
```

```
    "Render to DOCX" -> "Convert to PDF"
    "Render to HTML" -> Review
    "Convert to PDF" -> Review
    Review -> "Push to GitHub"
    "Push to GitHub" -> Done

    Done [shape=ellipse, style=filled, fillcolor=lightgrey]
}
```



More: https://quarto.org/docs/authoring/diagrams.html

3.13 Footnotes

You can add footnotes to explain details without interrupting the main text. Use `[^1]` where you want the footnote, and define the footnote at the bottom:

```
This is a sentence with a footnote.[^1]

[^1]: This is the footnote content.
```

Rendered result:

This is a sentence with a footnote.[1]

[1] This is the footnote content.

3.14 Notebook Output Embeds

If you're working with code notebooks (like Jupyter or R Markdown), you can include outputs such as plots or tables directly in the document. Quarto will automatically embed them after the code block.

More: https://quarto.org/docs/authoring/notebook-embed.html

4. Creating New Documentation

Creating a new document is simple when you follow a clear workflow. You can either start from a ready-made template or create a file from scratch.

4.1 Step 1: Start a New File

There are two ways to begin:

4.1.1 Option 1: Use a Template

1. Open the `src/templates/` folder.
2. Choose the right template:
    - `CLMS``_Template``_ATBD.qmd` for an Algorithm Theoretical Basis Document (ATBD)
    - `CLMS``_Template``_PUM.qmd` for a Product User Manual (PUM)
3. Copy the template into the `src/products/` folder.
4. Rename it to match your new document. Example: `my-product.qmd`
5. Create a new media folder named `my-product-media/` next to it to store images and charts.

4.1.2 Option 2: Create from scratch

1. Inside the `src/products/` folder, create a new file: e.g. `my-product.qmd`
2. Create a new media folder named `my-product-media/` for related images and figures.

 Using templates is recommended because they include structure and helpful comments. But starting from scratch gives you full control.

4.2 Step 2: Understand and Use the Template

Templates include:

- A pre-filled YAML header (the part at the top with `---`)
- Required sections and headings
- Helpful comments you should keep while editing

 If you use an already defined template, the YAML header is included — you don't need to add it manually.

4.3 Step 3: Add or Adjust the YAML Header

If you're creating the `.qmd` file from scratch, you must add the basic YAML header at the top of your file.

These fields are **required** for correct rendering:

- `metadata-files`: connects your document to shared metadata (like author, institution, version)
- `format`: controls how your document is rendered (HTML, styled DOCX, etc.)

> **Important**
>
> You **must include** the `pdf: default` format in the YAML header. Although PDF is not rendered directly during this step, defining it here ensures compatibility with the automated rendering workflow later. Details are explained in the Rendering Documentation section.

You must adjust `reference-doc:` under the `docx:` to specify the default style used for the DOCX/PDF output.

Here's a basic header you can use:

```
---
title:                    "Product                    SHORT                    NAME"
subtitle:                   "Product                    full                    name"
date:                                                                    "2022-10-06"
version:                                                                          1.0
template-version:                                                               1.0.0
product-name:                              Product                              Name
description:                           "Product                           DESCRIPTION"

metadata-files:
                                       -                    ../../metadata/default.yml

format:
                                                                                html:
                                                  css:            ../styles/styles.css
                                                                                docx:
                                  reference-doc:         ../styles/template-atbd.docx
                                                            hidden:               true
                                                  pdf:                         default
---
```

4.3.1 Field Descriptions:

- `title`: The main title of the document (displayed in the rendered output).
- `subtitle`: An optional second line of text under the title.
- `date`: The publication or last updated date.
- `version`: The version of your document (e.g. "1.0", "v2.3-draft").
- `template-version`: **Not rendered** — this is a special internal field that helps keep track of which template was originally used. Do not remove or modify this field unless you're updating the template version intentionally.

These fields must be filled in by the user. Only other fields — such as shared configuration or output format — are pre-filled in the template.

5. Importance of File Naming

Each `.qmd` file has a filename, like `my-document.qmd`, and this name plays an important role in how your documentation is organized and accessed online.

The filename (without the `.qmd` extension):

- Is used to generate the final HTML file name.
- Becomes part of the document's **URL** after publishing.

Example: If your file is named `products/data-guide.qmd`, the published URL will be `https://your-docs-site.org/products/data-guide.html`.

To avoid issues:

- Choose a clear, short, and consistent name when creating the file.
- Avoid renaming it later, as it can break links and references.
- Use lowercase letters and dashes (e.g. `product-user-manual.qmd`).

> **Important**
>
> Stick with the original name once created unless you have a strong reason and can update all links accordingly.

6. Ready-Made QMD Templates

To make documentation creation easier and more consistent, you can start your work from ready-made `.qmd` template files. These templates include the correct structure, required sections, and helpful comments to guide your editing.

Templates are stored in the `src/templates/` directory. Currently, two types of templates are provided:

6.1 ATBD Template

Filename: `CLMS``_Template``_ATBD.qmd`

This template is used for creating an **Algorithm Theoretical Basis Document (ATBD)**.

It includes:

- A structured outline based on standard ATBD requirements
- Placeholder sections for theory, algorithm descriptions, validation, and references
- YAML metadata pre-filled with necessary fields and style settings
- Commented guidance within each section

 Use this template when documenting the scientific or technical foundation of a data product.

6.2 PUM Template

Filename: `CLMS``_Template``_PUM.qmd`

This template is used for creating a **Product User Manual (PUM)**.

It includes:

- Sections for product overview, data access, interpretation, and use
- Notes on where to insert images, tables, and figures

- YAML header configured for standard rendering

 Use this template when documenting how users should interact with or interpret a product.

6.3 How to Use the Templates

1. Go to `src/templates/`
2. Choose either `CLMS``_Template``_ATBD.qmd` or `CLMS``_Template``_PUM.qmd`
3. Copy the file into the `src/products/` folder
4. Rename it to match your project (e.g. `my-product.qmd`)
5. Begin editing based on the guidance in the template

If you're unsure which template to use, ask your team lead or check what was used in previous similar documents.

> **Important**
>
> Do not modify the structure of the template unless absolutely necessary. Keeping the structure consistent across all documents ensures that the documentation system stays clear, professional, and easy to navigate for all users and reviewers.

7. Using Pandoc to Convert DOCX to QMD

When translating existing documents from Word (`.docx`) into Quarto Markdown (`.qmd`), you can use **Pandoc** to quickly generate a base file. This can save time by preserving text structure, headings, and even tables — though the result will still need cleanup.

7.1 What is Pandoc?

Pandoc is a powerful command-line tool that can convert documents between various formats, including Markdown, DOCX, HTML, LaTeX, and more.

To use Pandoc on your computer, download and install it from the official site: https://pandoc.org/installing.html

7.2 When and How to Use It

Use Pandoc **only** for converting existing `.docx` documents into `.qmd`. Do **not** use it to convert PDFs — Pandoc does not support PDF as an input format. This approach is ideal when you're:

- Migrating legacy documentation into the Quarto system
- Creating a quick starting point for manual cleanup
- Extracting embedded images and figures from `.docx`

7.3 Basic Usage Example

Open a terminal or command prompt — ideally from within **RStudio's Terminal tab** so you can stay in one environment — and run the following command. You can provide either a relative or full path to the `.docx` file:

```
$ pandoc my-doc.docx -o my-doc.qmd --wrap=none --from=docx --to=markdown+fenced_divs+grid_tables+pipe_tables+smart
```

7.3.1 What this command does:

- `my-doc.docx`: The input Word document.
- `-o my-doc.qmd`: Output file in Markdown format.
- `--wrap=none`: Prevents Pandoc from breaking long lines into multiple lines.
- `--from=docx`: Specifies that the input file is a Word document.
- `--to=markdown+fenced_divs+grid_tables+pipe_tables+smart`: Sets output format and enables enhanced table and layout options.

7.4 Where Are Media Files Stored?

When Pandoc finds images or other media in the `.docx` file, it extracts them automatically into a new folder.
By default, extracted media will be placed into a subfolder named `media/`, located next to your output `.qmd` file.
This is created automatically and will contain all image assets referenced in the converted file.

7.4.1 Changing the Media Folder Name

You can change the default media folder name using the `--extract-media` option:

```
$ pandoc my-doc.docx -o my-doc.qmd --extract-media=custom-media-folder
```

> **Note**
>
> Pandoc will create a `media/` subfolder *inside* the folder you specify. For example, running the above command will result in:
>
> `custom-media-folder/media/`
>
> If you want to follow the structure expected by your project (e.g. `my-doc-media/`), make sure to move the contents **out of that inner `media/` folder** and place them in the right location manually.

7.5 Next Steps

After conversion, you'll likely need to:

- Clean up unnecessary styles or extra spacing
- Rename and organize media files
- Add a proper YAML header at the top of the `.qmd` file
- Restructure the content to match your template or documentation style

While not perfect, this method gives you a solid starting point — especially for long or complex documents.

8. Default Styles and Options

To make documentation look consistent and professional, we use a set of predefined styles and settings. These are applied automatically when you render your `.qmd` files, so you don't need to worry about design details — just focus on the content.

8.1 Shared Styling Configuration

Most formatting options (fonts, colors, spacing, margins, etc.) are defined in shared configuration files. These files are stored in `src/styles` directory and include:

- A custom DOCX file for styling PDF output
- A CSS stylesheet for HTML
- Metadata files for shared fields like project name, institution, and contributors

Don't edit them! — they're used automatically by the rendering scripts.

8.2 Theme

It ensures that all documents have a clean, modern, and consistent appearance — both in HTML and PDF output.

> This theme is applied automatically. You do not need to configure it manually in your documents.

8.3 Table of Contents

The table of contents (TOC) is enabled by default and appears on the left-hand side in HTML documents.

You can control how many heading levels are shown by adjusting `toc-depth` in your YAML header, though the default setting (`toc-depth: 3`) is usually enough.

8.4 Customizing Per-Document Settings

If needed, you can override the default styles or add extra options in your document's YAML header. For example:

```
format:
                                                                                html:
                                                                  toc:                true
                                                             toc-depth:                3
                                                                                docx:
                                  reference-doc:       ../src/styles/custom-reference.docx
  pdf: default
```

9. Automatic Keywords Generation

You do not need to manually add keywords to your document's metadata. The system is designed to handle this automatically using AI during the publishing workflow.

9.1 How It Works

- The default Quarto metadata configuration automatically injects a special placeholder value into the `keywords:` field in your document's header.
- When your document is rendered and processed for publication, an AI service analyzes its content and automatically generates **10 relevant keywords**.
- These keywords help with document indexing, search, and classification on the publication platform.

This process ensures consistent keyword formatting and reduces the work required from authors.

9.2 What You Should Do

Nothing!
Simply leave the `keywords:` field untouched or omit it entirely. The publishing system will take care of it for you.

If you do add custom keywords for internal purposes, they will be overwritten during the publishing step — so it's best to let the system manage them.

10. Using RStudio with Quarto

RStudio is the recommended tool for working with `.qmd` (Quarto Markdown) files. It provides a simple, user-friendly interface for writing, editing, and rendering documentation.

You don't need to know R to use RStudio — we only use it here as a Markdown editor with rendering features.

10.1 Opening Your Project

1. Open RStudio.
2. Use **File > Open Project...** and select the root folder of the Technical Library.
3. Navigate to the `src/products/` folder.
4. Open the `.qmd` file you want to edit.

10.2 Editing QMD Files

You can edit `.qmd` files just like regular text documents. RStudio provides:

- Syntax highlighting for Markdown and code blocks
- A live preview of rendered output
- Auto-saving and formatting support

- Instant feedback when rendering errors occur

Use the **Preview on Save** option (checkbox in the toolbar) to automatically render your file every time you save it. This makes editing more efficient.

10.3 Managing Media Files

If your document uses images or diagrams:

- Place them in a dedicated media folder (e.g. `my-doc-media/`)
- Use relative paths in your `.qmd` file, like:

```
![Data Flow Diagram](my-doc-media/diagram.png)
```

11. Rendering Documentation

Once your `.qmd` file is ready, the next step is to render it — this means turning it into a final document that can be published. Quarto supports multiple output formats, but in our workflow, we focus on: **HTML** and **PDF**.

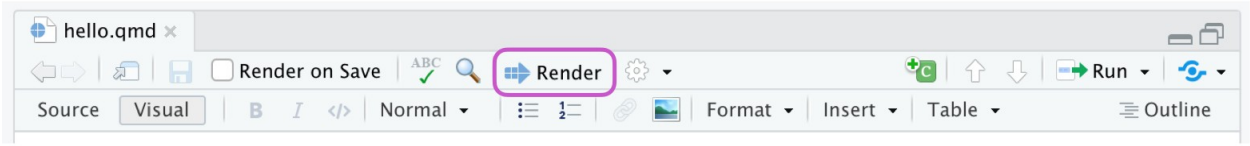
You can render your documentation directly in RStudio as described below or using command-line tools, depending on what you prefer. Both options work the same way and produce identical results — choose the one that fits your workflow best.

11.1 Render to HTML

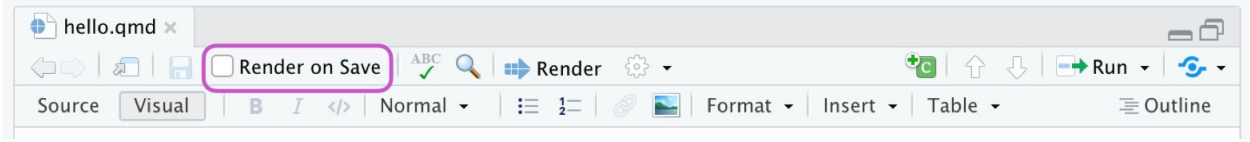
HTML is the default output format and is useful for previewing your document in a web browser while you work. Rendered HTML uses the custom Technical Library theme and includes a table of contents, clickable navigation, and consistent styles. It's a great way to check formatting, layout, and images as you write.

There are two ways to preview your `.qmd` file:

- Click the **Render** button at the top of the RStudio window.



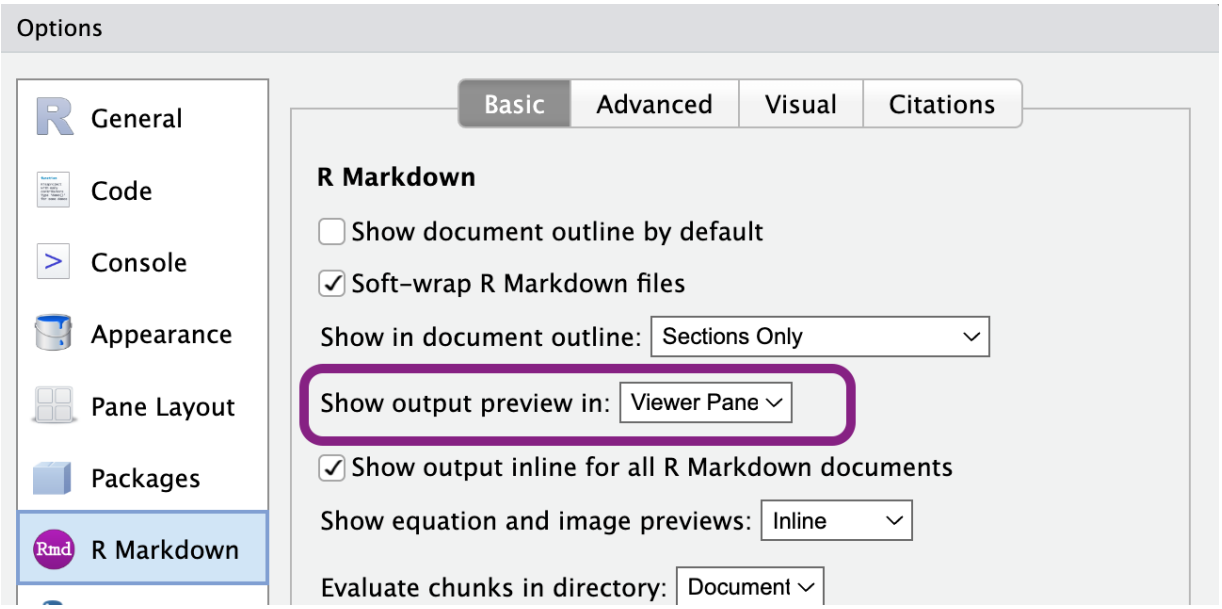
- Or enable **Preview on Save** (in the RStudio IDE toolbar). This option automatically re-renders your document every time you save it.



After clicking the **Render** button (or saving the file with **Preview on Save** enabled), the HTML version of your document will appear in the **Viewer** tab, located in the **Output** pane (typically in the lower right corner of RStudio).

If the **Viewer** tab is not visible:

1. Go to **Tools > Global Options** in the top menu.
2. Navigate to the **R Markdown** section.
3. Ensure that **Show output preview in:** is set to **Viewer Pane**.



This setting ensures that rendered documents are displayed within RStudio, providing a seamless preview experience.

11.2 Render to PDF via DOCX and LibreOffice

PDFs are not generated directly by Quarto. Instead, the process involves a few automatic steps:

1. Quarto first generates a `.docx` (Word) file using the styles and settings defined in the YAML header and shared config files.
2. Then, a LibreOffice macro automatically converts the `.docx` to `.pdf`.
3. The resulting PDF file is saved in the output location.

This approach ensures consistent and well-formatted PDFs, even across different systems.

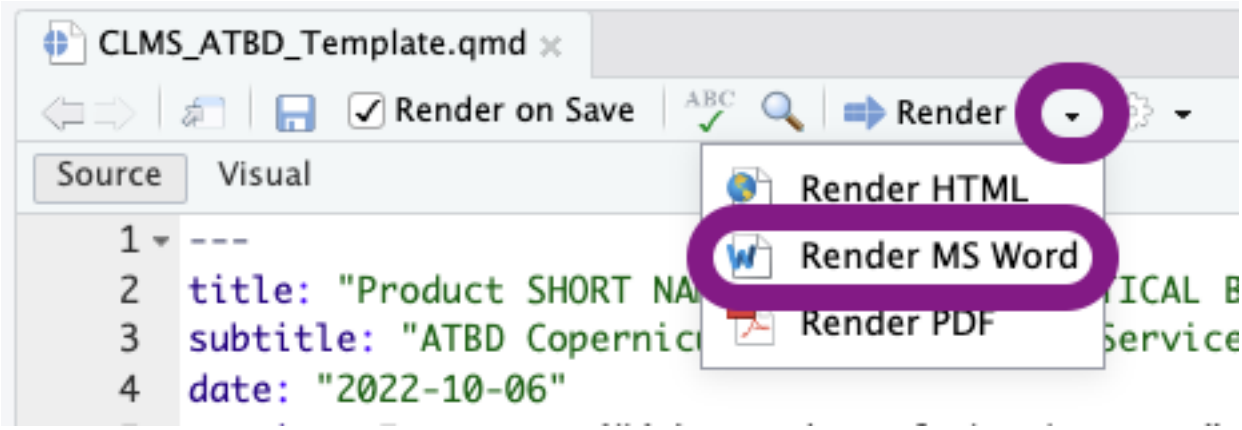
> **Important**
>
> - Make sure `pdf: default` is included in your YAML header — this triggers the PDF pipeline.
> - Do not define custom `pdf:` options unless you know what you're doing.

11.2.1 Preview with DOCX Instead of PDF

Instead of manually generating a PDF (which involves running scripts or waiting for the automated conversion), you can simply render a `.docx` file. It will look almost exactly like the final PDF because it uses the same styles and layout rules.

This is a great option when you want to quickly check how your document will look in PDF format — especially while you're still editing the `.qmd` file.

You don't need to change the order of output formats in the YAML header. Just click the **black arrow next to the Render button** in RStudio and select **"Render MS Word"** from the dropdown menu.



After rendering, the `.docx` file will automatically open in your default DOCX editor (e.g., Microsoft Word or LibreOffice Writer). If it doesn't open automatically, you can still find it saved in the **same folder as your `.qmd` file**, with the same base filename.

This approach is fast and avoids editing the YAML just to preview layout changes.

11.3 Output Location

When you render a single `.qmd` file locally (e.g. using RStudio or the command line), the output (HTML or DOCX/PDF) is saved next to your source file — usually inside the `src/products/` folder.

If you run the full command:

```
$ quarto render
```

then Quarto will build the entire Technical Library and save the results in a special `_site` folder. However, this is typically handled automatically by the rendering workflow in the GitHub repository during the publishing process.

> You do not need to render the entire library yourself. Just focus on rendering the file you are currently working on. This keeps things faster and easier to manage during editing.

11.3.1 About the `_quarto.yaml` File

The `_quarto.yaml` file is a special configuration file that defines project-wide settings, including the default output folder — which is `_site`.

When this file is present in the root of your project, RStudio (and Quarto) assumes you're working in **project mode**. That means it tries to render the **entire site**, not just the file you're editing.

This can cause a few issues during local editing:

- Slower preview performance
- RStudio sometimes doesn't pick up the latest changes right away (likely due to caching)
- Viewer pane might not display fresh output

Unfortunately, this behavior isn't clearly documented — but it can be confusing and frustrating.

11.3.2 Recommended Setup for Efficient Editing

To avoid these issues, the repository includes a renamed config file: `_quarto-not-used.yaml`. This allows users to edit and preview individual files efficiently without triggering full-site rendering.

By default, this means:

- RStudio operates in "single file mode"
- Output files (HTML, DOCX) are written directly next to the `.qmd` file (e.g. in `src/products/`)

11.3.3 Rendering the Full Project

When you need to preview or build the entire Technical Library locally:

1. Rename `_quarto-not-used.yaml` to `_quarto.yaml`
2. Run:

```
$ quarto render
```

This builds the full site into the `_site/` folder as defined in the YAML config.

> ⚠ Working with `_quarto.yaml` in place during regular editing **can work**, but it may lead to slower performance or outdated previews in the Viewer pane. For a smoother editing experience, keep it renamed by default.

12. Problems and Solutions

This chapter describes common problems you might face while editing `.qmd` files and rendering documentation — along with practical solutions and best practices. These issues are based on real experience working with the templates and rendering workflow.

12.1 Text Styling in DOCX

Problem

You want to style or color specific parts of text in the final document, such as bolding only part of a sentence or changing its color.

Solution

Use a **custom character style** from the template DOCX file. For example:

```
[**AD**]{custom-style="BoldRowText"}
```

This style (`BoldRowText`) is already defined in the `template.docx` file.

> **Note**
>
> If you're adding a new style to the `.docx` reference file, make sure it's a **character style** so it works correctly when applied inline in `.qmd` files. Custom styles must always be defined as character styles — not paragraph styles. Using the wrong type can cause formatting issues across the entire document.

12.2 Figure and Image Numbering

Problem

Figures and images inserted into `.qmd` files do not automatically include numbers in the rendered DOCX or PDF file.

Workaround

You can use figure referencing like this:

```
![Short description](my-doc-media/image.jpg){{#fig-3 height=356px}}
```

However, this approach wraps the image in a table structure, which might cause visible borders or layout issues — especially if your styling is strict or minimal.

Best Practice

For clean results:

- Add a manual figure number and title directly as text under the image.
- Avoid using automatic figure references unless necessary for cross-referencing.

Example:

```
![Diagram of processing flow](my-doc-media/flow-diagram.png)
**Figure 3.** Data processing flow chart.
```

12.3 Table Styling and Formatting

Problem

Only one table style is applied to all tables via the DOCX template, and additional formatting — like emphasizing specific rows — isn't applied automatically.

Solution

Use a custom character style (like `BoldRowText`) within cells that require special formatting.

```
[**MRVPP**]{custom-style="BoldRowText"}
```

This will bold specific text while keeping the rest of the table structure intact.

Best Practice

- Do not change the table structure or layout in the DOCX file manually.
- Always apply row or cell formatting by using inline styled text directly in the `.qmd` source.

 If you need to format a row differently (e.g. a header row within the body of the table), apply the style inline using the method above.

More issues will be added here as the system and workflow evolve. If you encounter a formatting issue or rendering problem that isn't listed, ask your team lead or check how other documents handled similar cases.

13. Document Review and Git Workflow

13.1 Pushing Changes to Git

TODO

13.2 Reviewing Documents

TODO