

# **Exercises: Conservation agriculture versus Organic agriculture 1MC**

## **Exercise 1: Farmers' responsibility – Who is right?**

Watch the video with farmer Niels Mamsen in Southern Jutland.

In the video he explains how he sometimes feels that society views agriculture as a “major culprit” in the climate and environment debate even though many farmers are actively working to reduce emissions, improve soil, and take financial responsibility for their operations.

Your task is to critically reflect on this viewpoint:

- Does he have a point that there is (too much) criticism of farmers?

Do you also experience that agriculture is often portrayed as the problem -and is that fair?

- What are your thoughts about entering the industry?

Imagine that in a few years you are responsible for fields, livestock, emissions, and farm management.

- In which areas do farmers have a particular environmental responsibility?
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## **Exercise 2: Visit a CA farm – Explore the system in practice**

You will visit a farm that works according to the principles of Conservation Agriculture (CA). The visit can be arranged locally (e.g., through the school's network) or via FRDK, which can often help find a farm in your area. You may also conduct the investigation on the school's experimental fields.

### **What to observe on the farm**

As you walk around the fields, pay attention to three things:

#### **1. Soil**

What does the surface look like? Are there plant residues (mulch)? Is the soil bare or covered?

#### **2. Roots and structure**

Can you see signs of life in the soil e.g., earthworm channels, porosity, or clear root pathways?

#### **3. Machinery and cultivation techniques**

Which machinery is the farmer using for direct seeding, strip-till, or reduced tillage? How do they differ from traditional ploughing and harrowing methods?

Take photos along the way and write a short caption for each (2–3 lines), describing what the image shows and why it is relevant to CA. These will be used later in the course when you are asked to “convert” a plot of land.

### **Questions for the farmer**

Prepare these questions:

- Why did you choose CA over conventional or organic farming?
  - What has been the biggest challenge—and the biggest benefit?
  - How do you work with cover crops, roots, and soil cover in practice?
  - Which machines are most important in your operation and why?
  - What do you wish you had known before transitioning?
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### **Exercise 3: Case – A farm transitioning to conservation agriculture**

In this assignment, you will work in groups to create a first draft of how a crop farm can begin working according to CA principles.

#### **Case: A plant production transitioning to CA.**

A 120 ha farm with sandy loam soil wants to improve soil quality and work more gently with the land.

Current crops:

- Winter wheat
- Spring barley
- Rapeseed
- Maize for feed

#### **Challenges on the farm:**

- Surface compaction
- Low organic matter content
- Unpredictable infiltration after rainfall
- High weed pressure from ryegrass
- Soil often left bare and dries out
- No CA-specific machinery yet

#### **Task – What to do**

Create a practical and realistic starting plan. Answer the four questions below and prepare a short 2–3 minute presentation.

##### **1. Which challenges should be addressed first—and why?**

Evaluate and prioritize the challenges presented in the case. Answer the three questions to help you prioritize:

- Which challenge makes it hardest to start transitioning to CA (choose one)?
- Which problems pose the greatest risk for failed crop establishment (choose several)?
- Which challenges can wait until later (choose several)?

**2. How can the farm improve soil structure and increase organic matter?**

Describe 2–4 actions that can improve soil quality over time.

**3. How will you manage ryegrass weed pressure during the CA transition?**

Develop a strategy:

- Which preventive methods can be used?
- How can crop rotation help?
- Which mechanical solutions are realistic without specialized equipment?
- How do you avoid excessive soil disturbance?

**Presentation**

Prepare a 2–3 minute presentation based on images to explain your strategy. Include:

1. Your prioritized challenges
2. Your plan for initial actions
3. Your ideas for building soil structure
4. Your solution to weed challenges

**Exercise 4: Action plan – Starting the transition to Conservation Agriculture**

Develop a concrete and realistic three-year plan for the case farm.

Think like advisors: What are the key steps to successfully transition without losing yield? Use insights from Assignment 3.

***Your plan must include:***

**1. Choice of cover crops and ground cover year 1:**

- Which species provide quick soil cover?
- Which species loosen soil in depth?
- Should nitrogen-fixing species be included—and why/why not?

**2. Strategy for improving soil condition:**

- Carbon buildup (C input): How to add as much carbon as possible?
- Microbiological continuity: How to ensure living roots year-round?

- Compaction management: Roots, light mechanical methods - or both?

### 3. **Machinery and investment:**

- What can be done with existing machinery?
- When is it relevant to invest in direct seeding or strip-till?
- How to avoid unnecessary soil disturbance during transition?

### 4. **Realistic timeline:**

- When can improvements be seen?
- How to maintain yield and economy during transition?
- When can full CA practices be implemented?

Use the text and [www.FRDK.dk](http://www.FRDK.dk) as references. Write approx. half a page including one image for each of the three topics.

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## **Exercise 5: Visit an Organic Farm**

Visit an organic farm to investigate how farmers manage soil fertility, weeds, nutrients, and decision-making and what CA can learn from organic farming.

During the visit: ask questions, take photos, and write notes for later use.

The class is divided into 4 groups, each focusing on one area:

### 1. **Soil condition and cultivation strategies**

- How is soil fertility maintained without synthetic fertilizers?
- Which cover crops or green manures are used?
- How is the soil structure?
- How are they working to build humus and soil carbon?

### 2. **Weeds and pests – without chemicals**

- Which mechanical tools are used?
- How often is weeding required?
- What are the biggest weed challenges?
- How are pests and diseases managed?

### 3. **Plant nutrition and nutrients**

- Where do nutrients come from?
- How is N, P, and K supplied?
- How are nutrient losses prevented?

#### 4. Machinery and work methods

- Which machines are used most?
- What tasks are most time-consuming?
- How is soil compaction avoided?
- Pros and cons of the system?

Take at least three photos illustrating your category.

Back at the school you will:

- Select the three most important things you learned.
  - Display photos with captions in the class room.
  - Compare organic methods with CA principles.
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#### **Exercise 6: Create a visual board – sorting organic regulation.**

In this assignment, you will create a visual board that provides a quick overview of organic farming principles and regulations.

The notice board must include:

- Photos and notes from your visit to the organic farm
- A set of 20 cards with rules and principles, from which you must select the 10 correct rules for organic farming

In groups of 3–4 students, you will receive 20 cards—some describe real rules, while others describe practices that are not allowed in organic farming or are unrelated to the regulations.

The purpose is for you to learn to distinguish between:

- Actual organic regulations
- General cultivation principles
- Misconceptions and things often confused with organic farming

How to do it:

- Go through the 20 cards and select the 10 correct ones
  - Write a 1–2 line explanation for each (what the rule means and why it exists)
  - Submit your photos and cards to your teacher and create a shared overview in the class
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#### **Exercise 7: Pros and Cons – Debate Preparation**

You are divided into four groups:

1. **CA advocates** – enthusiastic supporters who highlight the advantages of Conservation Agriculture
2. **CA critics** – devil’s advocates who argue against CA
3. **Organic advocates** – enthusiastic supporters who highlight the advantages of organic farming
4. **Organic critics** – devil’s advocates who critique organic farming

Each group must prepare 3 arguments that support their position.

**Documentation:** Each argument must be linked to one concrete observation or relevant source, for example:

- Something observed during the farm visit
- Something from the article on CA and organic farming
- Insights from the video featuring Niels Mamsen

When you are ready, the debate begins.

First, groups 1 and 2 will debate while groups 3 and 4 listen. Afterwards, the roles are reversed. Your teacher will decide how long the debate should last.

The purpose is to learn how to argue professionally for and against different farming systems.

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## **Exercise 8: The Debate**

Now you will debate in the same groups as in Assignment 7. The debate can take place outside to make it more relaxed.

### **Debate structure:**

1. Opening statements (1 minute per group)
2. Main round:
  - Main arguments (2 minutes per group)

Advocates present

- o Critics respond
- o Advocates have the right to a short rebuttal

- Counterarguments (2 minutes per group)

Critics present

- o Advocates respond
- o Critics have the right to a short rebuttal

3. Cross-examination: Groups ask each other questions (5 minutes)

All groups may ask questions

- Ask about specific conditions (soil structure, chemicals, machinery, economy, environment)
- Challenge each other's assumptions
- Point out disadvantages or consequences

4. Closing statements (30 seconds per group)

Summarize why your approach (or critique) is the most convincing

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### **Exercise 9: Design “The Perfect Farm” – combining strengths of CA and Organic agriculture**

You will now use your knowledge from presentations, farm visits, and previous assignments to develop a plan for *the perfect farm*, where Conservation Agriculture and organic farming are combined in a way that both protects the soil and ensures stable yields.

You are encouraged to be visionary -but the plan must be realistic enough to be implemented in a Danish plant production context.

You will work in groups of 3–4 students.

Your plan must include:

1. How does the farm avoid unnecessary soil disturbance?
  - How can you combine CA's minimal tillage with organic mechanical methods?
  - How do you avoid too many field passes?
  - How do you keep the soil covered with plants or material?
2. How does the farm minimize (and preferably completely avoid) chemicals?
  - Which biological or mechanical strategies can be combined to reduce or eliminate the need for chemicals?
  - How can crop choice, sowing time, cover crops, and crop rotation reduce weeds and diseases?
3. How does the farm ensure a healthy economy?
  - Which machines are necessary, and which can be avoided?
  - How do you maintain stable yields during the transition phase?
  - What income opportunities or cost savings are possible?

## **Product: A complete farm model**

You must create a short presentation or poster that shows:

- Your field plan
- Your key cultivation principles
- 3 strengths of your combined model
- 2 risks—and how you will address them

You may also submit a video or infographic—consider using NotebookLM (<https://notebooklm.google.com/>) online to create a cool infographic.

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## **Exercise 10: From Idea to Practice – School field plan**

Now you will gather your observations and ideas from the course and create a comprehensive plan for a field plot on the school’s regenerative trial area, which you have previously worked with or observed. The plan should show how you will translate your professional decisions into concrete actions in the field.

Here, you must demonstrate how the ideas behind “the perfect farm” can be turned into practical actions.

Your field plan must include:

### **1. Choice of crops and cover crops**

Which species support both:

- minimal soil disturbance (CA)
- biological fertilization and weed prevention (organic farming)?

### **2. Soil improvement measures**

How will you:

- build carbon?
- ensure living roots?
- avoid compaction?
- keep the soil covered?

### **3. Weed strategy**

How will you combine:

- CA’s dense plant cover and sowing time.
- Organic farming’s mechanical strategies so that weeds are kept under control?

#### 4. **A yearly plan**

- When do you sow?
- When do you cover the soil?
- When do you perform inter-row cultivation?
- When do you harvest?
- How do you ensure the soil is not left bare?