**GUIDELINES FOR USING AI AND LARGE LANGUAGE MODELS IN LIVESTOCK, AND CLIMATE CHANGE**

*A Practical Advisory Notebook for Extension Workers, Researchers, and Practitioners*

# 12 Prompt Engineering Guidelines for Climate, Agriculture, and Livestock

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# Prompt Engineering — 12 Guidelines for Climate, Agriculture & Livestock

### What Is a Prompt?

A prompt is the instruction or question you give to an AI tool. The quality of the prompt directly determines the quality of the response. Good prompts include a role (who the AI should act as), a clear task, relevant context (location, audience, conditions), and a desired format. Poor prompts produce vague, general, or unusable outputs.

> *Sample Well-Structured Prompt: "Act as a livestock advisor. Explain heat stress management for dairy cattle for smallholder farmers in hot climates. Use simple language and bullet points."*

### The 12 Prompt Engineering Guidelines

#### 1. Provide Clear Context and Scope

Include all relevant details about the situation in your question — location, time frame, and conditions. Vague prompts yield general answers. Specifying where, when, and under what conditions helps the AI focus on the right information.

> **Example Prompt:**
> *"In Ontario by 2050, how will warmer winters and less snowfall affect cattle weight gain, and what adaptation measures can livestock producers take?"*

#### 2. Be Specific About Details

Ask about one clear goal or aspect at a time. Specify exactly what you want — a number of items, a type of data, a specific scenario. Detailed prompts reduce ambiguity and ensure targeted, useful answers.

> **Example Prompt:**
> *"List three strategies for Ontario beef cattle producers to reduce water use during drought, and explain why each strategy helps conserve water."*

#### 3. Define the AI's Role or Perspective

Tell the model who it should be or who it is speaking to. Phrasing like 'Act as a livestock veterinarian' or 'Explain to a local rancher' guides tone and content, making answers more practical and audience-appropriate.

> **Example Prompt:**
> *"Imagine you are an experienced livestock veterinarian speaking to a rancher. Explain how rotating pastures can help adapt to changing rainfall patterns in southern Ontario."*

#### 4. Specify Desired Output Format or Structure

Tell the model how to organize its answer. If you want bullet points, numbered steps, a table, or a brief summary, say so explicitly. Clear structure requests make answers easier to read, use, and share.

> **Example Prompt:**
> *"List five sustainable water management strategies for Ontario livestock operations in bullet points. For each, include a brief explanation of why it is effective."*

### 5. Use Clear, Simple Language

Phrase your prompt in everyday, non-technical terms. Even though LLMs understand technical language, simpler wording often yields clearer responses. Ask the AI to 'avoid technical terms' or 'explain to a rancher without a science background' when needed.

> **Example Prompt:**
> *"Explain how high heat affects beef cattle, using language a rancher without a science background would understand."*

### 6. Break Down Complex Tasks

If you need a comprehensive plan or analysis, break it into steps or parts. Say 'Outline a step-by-step plan' or 'First list the main problems, then suggest solutions.' This guides the AI to cover each component methodically.

> **Example Prompt:**
> *"Outline a step-by-step plan for an Ontario livestock operation to prepare for more frequent summer heat waves due to climate change."*

### 7. Ask for Explanations or Reasoning

Encourage the model to show its work by using phrases like 'Explain why' or 'step-by-step.' This leads to more thoughtful, transparent answers and helps you verify the reasoning behind each recommendation.

> **Example Prompt:**
> *"Tell me, step by step, why adopting drought-resistant forage would improve resilience on Ontario livestock operations during dry seasons."*

### 8. Provide Examples or Desired Style

Show the model what you want by giving an example format. This 'few-shot' approach dramatically improves the match between the AI's output and your expectations. Even one sample row or sentence helps.

> **Example Prompt:**
> *"Example format: 'Practice: rotational grazing — Benefit: improves pasture recovery and reduces overgrazing.' Using this format, list three climate-friendly livestock management practices and their benefits for Ontario operations."*

### 9. Ask for Evidence or Verification

LLMs can produce plausible-sounding but incorrect facts. To improve reliability, ask for sources, citations, or data. This signals to the model that accuracy matters and prompts it to draw on more specific knowledge.

> **Example Prompt:**
> *"How does extreme heat impact livestock productivity? Explain your answer and cite any relevant studies or data sources for the main points."*

### 10. Iterate and Refine with Follow-up Questions

Treat the chat as a conversation. If the first answer is not detailed or clear enough, ask follow-up questions. Build on the AI's response by saying 'Can you elaborate on X?' or 'What about Y?' to drill deeper into the topic.

> **Example Prompt:**
> *"Step 1: 'What are the main effects of drought on Ontario livestock?' — Step 2 (follow-up): 'Given those effects, what water-saving strategies should Ontario livestock producers adopt?'"*

### 11. Ask One Thing at a Time

Keep each prompt focused on a single question or topic. Avoid packing multiple unrelated questions into one prompt, as this can confuse the AI and lead to scattered, incomplete answers.

> **Example Prompt:**
> *"What water management methods can help reduce water use on cattle operations in Ontario?"*

### 12. State Assumptions and Timeframes

Be explicit about any assumptions or time periods in your question. Mention the relevant date, policy scenario, or emission pathway (e.g., 'as of 2025' or 'by 2030 under a high-emission scenario') to ensure the answer is aligned with the correct context.

> **Example Prompt:**
> *"Assuming current climate policies remain the same, what challenges will Ontario livestock producers face by 2050?"*