



Food and Agriculture Organization
of the United Nations

HACCP – STEPS 4 AND 5

**CONSTRUCT
FLOW DIAGRAM
AND ON-SITE
CONFIRMATION**

FAO Good Hygiene Practices (GHP) and
Hazard Analysis and Critical Control Point
(HACCP) Toolbox for Food Safety

HACCP – STEPS 4 AND 5

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Hazard Analysis and Critical Control Point
(HACCP) Toolbox for Food Safety

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Technical note for readers

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**CONSTRUCT
FLOW DIAGRAM
AND ON-SITE
CONFIRMATION**

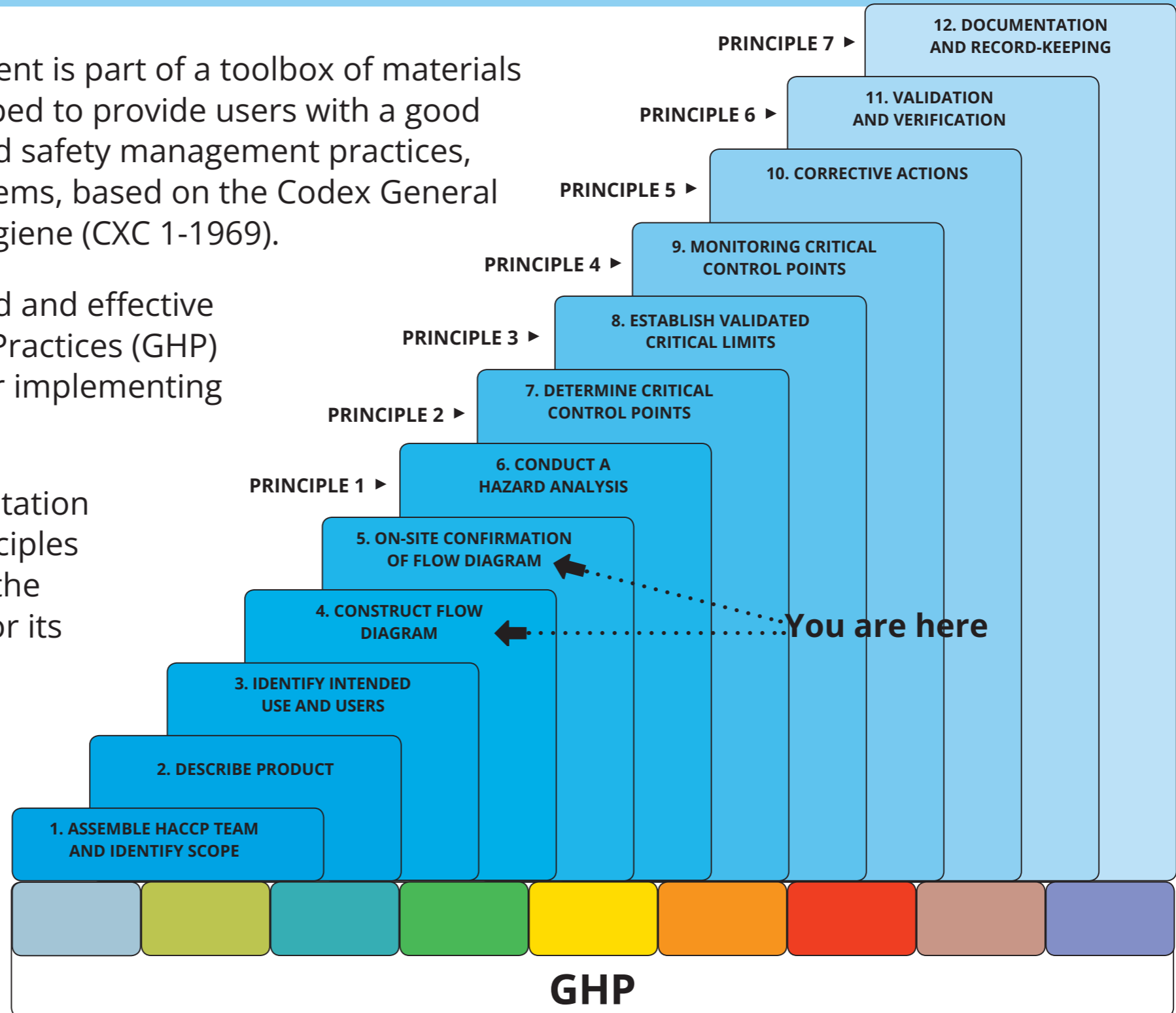
INTRODUCTION

This guidance document is part of a toolbox of materials and has been developed to provide users with a good understanding of food safety management practices, including HACCP systems, based on the Codex General Principles of Food Hygiene (CXC 1-1969).



Well established and effective Good Hygiene Practices (GHP) set the foundation for implementing a HACCP system.

This graphic representation shows the seven principles of HACCP along with the 12 successive steps for its application.



CONTEXT

A flow diagram should include all the steps to produce a specific food product, and it should include all inputs, including ingredients and contact materials, water and air, if relevant. The same flow diagram can be used for several products that are manufactured using a similar process. The flow diagram should be sufficiently detailed so that it can be used when conducting the hazard analysis, which is the basis for evaluating the possible occurrence, increase, decrease or introduction of hazards.

The processing activities should be confirmed with the flow diagram during all stages and hours of operation, and the flow diagram should be amended where appropriate.

Learning objectives

This document provides guidance on how to:

- develop a flow diagram for the production process of any specific product and to know what considerations need to be in place to develop the flow diagram;
- understand how a flow diagram helps in conducting a hazard analysis;
- understand the need for on-site confirmation of the flow diagram; and



- **document these steps as part of the HACCP plan.**

**CONSTRUCT
FLOW DIAGRAM
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CONFIRMATION**

HACCP STEP 4

Construct flow diagram

Once the HACCP team has complete descriptions of the product and a clear understanding of its intended use and users, the team creates a detailed description of each step in the production process.

It is easier to identify routes of potential contamination, to suggest methods of control and to discuss these among the HACCP team if there is a flow diagram.

According to Codex:

Flow diagram: A systematic representation of the sequence of steps used in the production or manufacture of food.



HACCP STEP 4

The initial **development of a flow diagram** will require some time and effort. Once a flow diagram is prepared for a specific product undergoing certain processing, the diagram can be used for a number of products undergoing the same processing procedures.



Things to consider

- The flow diagram should identify important processing steps from receiving of raw materials to final shipping of product.
- Interviewing people working on the line, observing the operation and available blueprints can be helpful in the development a flow diagram.
- Complex manufacturing operations can be broken down into multiple, smaller, more manageable flow diagrams that link or reference each other.
- Flow diagrams should be clear, accurate and sufficiently detailed to the extent needed to conduct the hazard analysis.
- Developing accurate flow diagram and plant schematic takes time and requires a good understanding of the facility and production process as well as experience in process description.

HACCP STEP 4

What to include in the flow diagram

Flow diagrams should include, but not be limited to, the following:

- the sequence of all process operations;
- where raw materials, ingredients, processing aids, packaging materials, utilities and intermediate products enter the process;
- any outsourced processes;
- where reworking and recycling take place within the process; and
- where end products, intermediate products, waste and by-products are released or removed from the process.

HACCP STEP 4

Flow diagrams help the HACCP team by:

- providing a structured understanding of the production process;
- presenting each process step in a way that clearly demonstrates what happens to raw materials, ingredients and packaging along the production process;
- describing the process to those not familiar with it, without having to be present at the processing line;
- facilitating hazard identification; and
- aiding decision-making regarding necessary controls.

HACCP STEP 4

Flow diagram formats

Businesses should use the format they feel most comfortable with. Possible formats include the following:

- a table-based or list format; and
- a more graphic format using boxes and arrows either hand-drawn or designed using software.

Sequence and interaction of steps in the operation

A flow diagram should focus only on the processing steps that the food business operator (FBO) has control over. The flow diagram should reflect a particular food business operation and product, so it should be unique, even if the same product is processed by a different FBO.



The flow diagram and plant schematic should be documented.

(See Supporting documents for templates and examples)

HACCP STEP 4

→ Example

Let us examine the various flow diagrams required for food businesses in the bread-making sector:

The raw ingredients (such as wheat, salt, sugar, yeast and water) are procured from different producers, manufacturers and vendors.

- Wheat undergoes milling, processing and storage before arriving at the bread manufacturing facility. A miller's flow diagram begins with receiving grains from the farm, continues with transporting it to a storage facility, and ends with the flour sacks leaving the facility.
- Similarly, other raw ingredient suppliers will have their own flow diagrams, which are not of importance to the bread manufacturer.
- The bread manufacturer's flow diagram begins with receiving the raw materials and ends with packaging and shipping. (It will not include the primary production of wheat or other raw ingredients.)
- If packaging materials undergo a processing step in the FBOs operations (e.g. folding, expanding, labelling etc.), this should be captured in the flow diagram.

HACCP STEP 4

The flow diagram must capture all **relevant** process and operational steps and all incoming all raw materials and the step at which they are introduced (e.g. processing (mixing and blending), packaging and rework loops). If the operations involved are complex, they can be broken down into multiple, smaller, more manageable flow diagrams that link to and reference each other and no crucial steps can be omitted.

Rework loops

Rework is clean, unadulterated food that has been removed from the processing process at any point up to and including final packaging for reasons other than unsanitary conditions, that is suitable for use as food or a food component, and that can be successfully reconditioned by reprocessing.

For example, if, upon final inspection of raw ingredients that have been prepared, mixed, processed and packaged, defects are detected or some standards are not met, and the food is able to be unpacked, sorted (defective ingredients removed) then re-introduced, or re-worked, into the process to be reprocessed.

HACCP STEP 4



Things to consider

- If the rework process is not carefully controlled, it can pose a threat of contamination. Hence, properly executed flow diagrams must be in place describing rework procedures.
- Even occasional rework must be captured.
- The rework or work-in-progress should be segregated and appropriately labelled to minimize the potential for incorporation into the wrong product.
- Whenever feasible, rework should be introduced back into the same product.
- Alternatively, rework can be added into another product with the same food allergen profile.

HACCP STEP 4

Process flow diagrams

➔ Additional considerations:

- Numbering of the processing steps can be help with hazard identifications, especially when similar or identical terms (such as water, heating/cooling, etc.) are used repeatedly.
- Avoid overloading a flow diagram with general operations that are not carried out within the production process or that are covered by GHP (e.g. machine maintenance and cleaning).
- It might be useful to begin with a basic diagram, then adding to it.
- It is useful to indicate the hygiene zones (as explained in GHP Section 3) in which process steps are executed (for example, bottling of beverages takes place in high-hygiene areas, while secondary packaging and labelling can occur in low-hygiene areas).
- As appropriate, the release of end products, intermediate products and waste can be included in the diagrams. Ideally, waste management is addressed previously through GHP prerequisite programs.
- External experts can be consulted to support the HACCP team, if needed.

HACCP STEP 5

On-site confirmation of flow diagram

The accuracy and completeness of the flow diagram should be ensured by an on-site inspection, performed by a person or persons with sufficient knowledge of the facility and processing operation.

- The processing activities should be confirmed against the flow diagram during all stages and hours of operation and the flow diagram should be amended as needed.
- A careful review process may reveal operations that are not carried out safely (such as improper chilling of raw materials). In such cases, the HACCP team must take necessary corrective action.
- The confirmed flow chart are an important basis for the systematic approach to hazard analysis, enabling the HACCP team to identify hazards and to evaluate control points and document them in a structured manner.

Regular onsite confirmations of the flow chart(s) should be performed

- Production processes often change over time due to re-organization of personnel, the addition of new machines and other causes.
- Regular onsite confirmations increase the confidence of FBOs as they enable them to remain aware of potential risks and institute the necessary corrective measures.


IN SUMMARY

- ➔ A flow diagram is a schematic description of a production process.
- ➔ They provide a clear overview of the facility, the process flow and steps.
- ➔ A food business flow diagram focuses on the steps the business has control over.
- ➔ A flow diagram must contain enough detail to facilitate hazard identification.
- ➔ On-site confirmation of flow diagrams should be performed in order to ensure the accuracy as they are a fundamental part of the HACCP plan. It might be helpful to check the flow diagram against the plant schematic produced as part of the prerequisite GHP programmes.



For additional information, please consult the **Further reading** section accessible from the [SECTION LANDING PAGE](#).

EXERCISE: FOOD SAFETY FOR THOUGHT

<p>This is the little “game” we created. This will apply to all HACCP steps, except the intro.</p>	<p>GHP PROGRAMMES </p> <ul style="list-style-type: none"> <li data-bbox="987 613 1509 705">1. INTRODUCTION AND CONTROL OF FOOD HAZARDS <input type="checkbox"/> <li data-bbox="987 746 1509 838">2. PRIMARY PRODUCTION <input type="checkbox"/> <li data-bbox="987 878 1509 970">3. ESTABLISHMENT - DESIGN OF FACILITIES AND EQUIPMENT <input type="checkbox"/> <li data-bbox="987 1011 1509 1103">4. TRAINING AND COMPETENCE <input type="checkbox"/> <li data-bbox="987 1144 1509 1236">5. ESTABLISHMENT MAINTENANCE, DISINFECTION, AND PEST CONTROL <input type="checkbox"/> <li data-bbox="987 1277 1509 1369">6. PERSONAL HYGIENE <input type="checkbox"/> <li data-bbox="987 1410 1509 1502">7. CONTROL OF OPERATION <input type="checkbox"/> <li data-bbox="987 1543 1509 1635">8. PRODUCT INFORMATION AND CONSUMER AWARENESS <input type="checkbox"/> <li data-bbox="987 1676 1509 1768">9. TRANSPORTATION <input type="checkbox"/> 	<p>Please explain your choices.</p>
<div data-bbox="343 766 864 889" style="background-color: #00AEEF; color: white; padding: 5px; text-align: center; border: 1px solid black; margin-bottom: 5px;"> <p>4. CONSTRUCT FLOW DIAGRAM</p> </div> <div data-bbox="343 909 864 1032" style="background-color: #00AEEF; color: white; padding: 5px; text-align: center; border: 1px solid black;"> <p>5. ON-SITE CONFIRMATION OF FLOW DIAGRAM</p> </div>		
<p>GHP are fundamental to the successful application of HACCP.</p> <p>Think of a food operation that you are familiar with, and select those GHP elements that you feel are most relevant for the application of HACCP steps 4 and 5.</p>		

CONSTRUCT FLOW DIAGRAM AND ON-SITE CONFIRMATION

KEEP READING

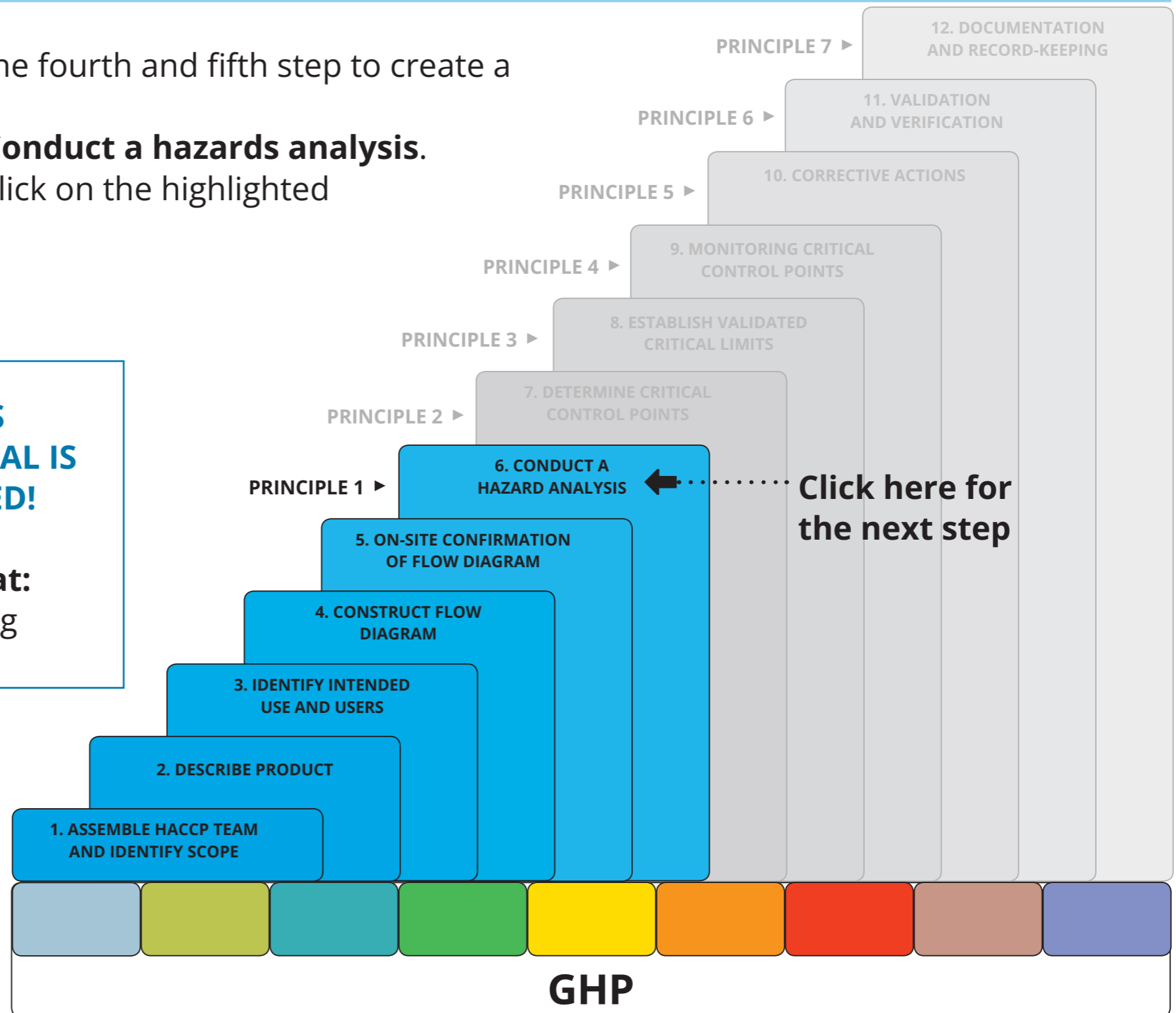
You have completed the fourth and fifth step to create a HACCP system.

The next step will be **Conduct a hazards analysis.**

To continue reading, click on the highlighted card below.

**FEEDBACK ON THIS
GUIDANCE MATERIAL IS
ALWAYS WELCOMED!**

Please contact us at:
food-quality@fao.org



KEEP READING

[GHP and HACCP Toolbox for Food Safety](http://www.fao.org/good-hygiene-practices-haccp-toolbox)

www.fao.org/good-hygiene-practices-haccp-toolbox

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