



# Use of bocachi fertilizer to reduce the impacts of frosts in Bolivia

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<b>Country of first practice</b>	Bolivia (Plurinational State of)
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<b>Sustainable Development Goals</b>	Zero hunger, decent work and economic growth and life on the land

## Summary

This practice describes the production and use of bocachi fertilizer as an organic alternative to chemical fertilizers reducing the impacts of frosts.

## Description

The use of organic fertilizers improves the soil structure through the incorporation of nutrients and micro-organisms, regulating the PH. The use of bocachi reduces the need of other external inputs (often not available in isolated communities) and to increase the efficiency of locally available resources in a sustainable way.

The bocachi fertilizer is produced by the fermentation process of organic material. In good humidity and temperature conditions, micro-organisms decompose and the simplest fractions of organic material, such as sugars, starch and proteins, release their nutrients. The elaboration of this fertilizer presents advantages, as:

- no production of toxic gases nor bad odours;
- low-cost;
- no need for storage or transport;
- may be produced in a relatively short period of time (depending on the environment, between 12 and 24 days); and

- the product can be utilized immediately after its preparation

In the region, at 3 850 meter above sea level, the weather is variable, with average temperatures ranging between 7 and 18 c throughout the year, nonetheless, extreme temperatures decrease until -13 °C during winter. Low precipitation rates cause soil to lack organic material due to the scarce growth of vegetables, which affects their productivity.

The objective of the bocachi fertilizer is to reduce the impacts of frosts in crops.

### 1. Implementation of the technology

The elaboration process of bocachi distinguishes two phases:

#### 1.1 First phase

The first phase corresponds to the fermentation of components, where temperature may rise up to 70 and 750 °C due to an increase in the microbial activity; subsequently, temperature will decrease due to exhaustion of the energy source.

#### 1.2 Second phase

The second phase initiates when the fertilizer starts the stabilization process until reaching a state that allows immediate utilization.



# Climate Change Adaptation and Disaster Risk Reduction

## 2. Preparation of bocachi fertilizer

1. Solid components are arranged in layers. First, a layer of weeds, covered by a layer of dung, a layer of ash and a layer of bran. Between layers, a layer of sugared water and yeast.
2. When the heap reaches a 1.5 m height approximate, everything is damped homogeneously with sugared water, water and yeast. Humidity must reach 40% and it is possible to determine it by taking a handful of the mixture and compress it. The mixture should not crumble nor drip.
3. The heap is then protected with a plastic cover secured to the ground with stones. This will allow to maintain humidity during the fermentation process.
4. The mixture must be turned over every 12 hours for a week to avoid the fertilizer to burn up. It is necessary to verify temperature ranges between 35 and 50 °C. Temperature may be controlled by introducing a machete in the mixture for 2 minutes. When removed, the machete should be cold enough to be held in hand. If not, the mixture should be turned over until it reaches the desired temperature.
5. The fertilizer is ready when the mixture starts producing a fermented odour and is covered with fungus colonies. If on the contrary, the mixture gives off a rotten odour, it means the fermentation process was not successful. The fermentation process should not exceed 30 days. It is recommended to use it immediately once it is ready. Finally, once the fertilizer has cooled down, it should dry up in the shade, and then be extended on a cement surface.

## 3. Application of bocachi fertilizer

- When applied, the fertilizer should not be in contact with the roots, since the

fermentation process continues and there is a risk of burning the plant;

- the fertiliser is usually applied before a cold wave/hail event; and
- a second application is necessary immediately after the event.

## 4. Agro-ecological zones

- Temperate, cool

## 5. Objectives fulfilled by the project

### 5.1 Resource use efficiency

This technology helps poor farmers to save and protect natural resources through using organic inputs that would be unused otherwise.