



## Djilemo oven: a cassava drying method

### I. Background:

<p><b>1. Name of innovation</b> Djilemo oven: a cassava drying method</p> <p><b>2. Country – Region</b> Cameroon</p> <p><b>3. Organization</b> CAIC common interest group, BP 257, Douala, Cameroon</p> <p><b>4. Who is the innovator?</b> Louis DJILEMO, Agricultural Engineer and Post-Harvest Technology Expert</p>	<p><b>5. Actors involved</b> Women processors and producers of cassava and users of flour and starch</p> <p><b>6. Implementation date</b> March 2006</p> <p><b>7. Type of innovation</b> Technological</p>
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### II. Key Issues:

#### 8. Summary

The innovation consists of a drier adapted for the drying of certain cassava products, particularly starch and grated cassava paste. The Djilemo oven is a fuel-fired oven composed of two main sections: a combustion chamber to produce heat and a drying chamber to lay out the products to be dried. The energy source is bioenergy, particularly wood, cassava peel or other vegetable fuel. The technology entails two compartments, which must be hermetically separated.

1. *The combustion chamber*, composed of a fire-box, a 4 mm-thick iron or sheet-metal case and a chimney; a front opening perpendicular to the fire-box entrance allows fresh air to be supplied to the air heating chamber; a latticed sheet separates the combustion chamber from the product exposure chamber.

2. *The drying chamber* where the products are exposed, composed of a triple wall: an outside layer made of plywood, a middle layer of an insulating material and an inner layer of aluminium. The inside of the chamber allows two trays to be arranged one above the other, with about 10 cm between them; it has two doors, so that the trays can easily be placed in the chamber. The upper part of this chamber has a hole to extract the air that has absorbed water during the drying process. The fire-box fed by the wood and cassava peel heats the iron case, which radiates heat. Captured in the air heating cell, this energy is used to heat the very damp cool air. The temperature of the air intended for drying reaches about 80° C with a low moisture level. The air then flows over the products laid out on the trays, where it again absorbs moisture before leaving through the evacuation exit. As the hot air flows over the products, they are progressively dehydrated. The trays are switched during drying so that the end product is of uniform quality.

#### 9. What issues does the innovation address?

- The perishable nature of cassava
- The lack of techniques to conserve cassava for any length of time
- The transport of cassava roots
- The search for new outlets for cassava products

#### 10. Key success factors for replication:

- Wholly local manufacture with little technical difficulty
- Ease of installation of the unit in production zones
  - Reasonable investment cost

#### Main results

- Protection of products from the waste products of combustion
- Highly perishable product, with no way of conserving it in its raw state

- Combined with a cooking stove, the Djilemo oven would allow farmers to do their cooking while they dry their cassava flour

**11. Accessibility:** (Poor, gender, youth, migrants...)

- Women (particularly with the Djilemo oven built to dry unfermented cassava flour at the Women's Entrepreneurial Initiative Centre)
- Young people (both rural and urban)

**13. Difficulties encountered**

- No control over drying parameters
- Poor control over the drying process
- Lack of flexibility with regard to energy

**14. Financial aspects**

Investment cost: CFAF 1,000,000 (the Women Entrepreneurs' Initiative Centre's Djilemo oven)

With regard to the sale of 1-kg bags of flour, labels were affixed to the end of the bags, indicating the quantity, weight, date of manufacture, name of company and other details.

### III. Technical Summary:

- Materials used: base in brick, trays in wood, drying chamber in plywood, aluminium and an insulating material
- Drier capacity: 1,000 kg
- Drying time: 48-72 hours
- Energy consumption: 1,000 FRS (100 FRS/load), or 20-30 kg of wood in 24 hours
- Manioc peel
- Length of life: 5 years
- Need for ventilation: yes

Maintenance of the Djilemo oven is simple, entailing:

- Raking out the fire-box to remove the ash (to be used to fertilize the fields, inasmuch as it is rich in potassium)
- Cleaning and periodically washing the drying trays
- Ensuring that the drying chamber is air-tight
- Ensuring that the supports for the trays are firm

### IV. Follow up:

**15. Key contacts:**

Name	Organization	Email
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**16. Useful web link:**

**17. Key documents:** (Name of the document + Link or Contact or Co ordinates)