

# FADAMA III-AF



**HAND BOOK**

**ON**

**RECIPES OF SORGHUM AND SORGHUM BASED FOODS IN  
NIGERIA**

**Hakeem A. Ajeigbe, Bernard Herbert, and Caroline A.  
Oni**



**FADAMA III-AF**



## **Acknowledgement**

This handbook would not have been possible without the support and encouragement of the National Project Coordinator FADAMA III-AF, Mr Adetayo Adewunmi, who provided all the necessary support and encouragements. We also appreciate our Task Team leader, Dr Tunji Oredipe for his support and technical assistance. The authors wish to express profound appreciation to staff of FADAMA III-AF for their support, ICRISAT Nigeria and several participating women groups for their encouragement and enthusiasm during meetings and trainings.

Hakeem A. Ajeigbe, Bernard Herbert, and Caroline Ajoke Oni, 2018.

## **Forward**

Sorghum plays an important role in the diets and economies of people in Nigeria. The average per capita annual sorghum consumption in major sorghum growing areas, is more than 75 kg. Global prices for agricultural commodities have risen dramatically in recent years, making agriculture an attractive investment once again. Industrial demand of sorghum grains by malting industries for beverages, and flour mills as substitute for wheat to produce composite flour as well as high energy foods, has risen significantly in recent years. The micronutrient (Fe and Zn) of sorghum is also higher than most cereals except millet making it an health food. Sorghum recipes therefore have high nutritive value for children, and for treatment of malnourishment. This hand book was developed with the objectives of adding value to sorghum produce, and create jobs along sorghum value chain for Nigeria's teeming youths and women. The Handbook is a deliberate and concerted efforts of the Sorghum Commodity Value Chain of FADAMA III-AF with Technical support of International Crop Research Institute for the Semi-Arid Tropics (ICRISAT) to publicize sorghum recipes for household consumption and for income generating activities. The handbook highlights some basic sorghum product (recipes) for family consumption as well as income generating activities

Mr Adetayo Adewunmi  
National Project Coordinator  
FADAMA III-AF

## **TABLE OF CONTENTS**

Title Page

Acknowledgement

Forward

Table of Contents

Fadama III-AF Highlight

1.0 INTRODUCTION

2.0 SORGHUM AND SORGHUM BASED RECIPES IN NIGERIA

2.1 Sorghum Flour methods of preparation and picture

2.2 Sorghum Composite Flours, methods of preparation and picture

2.3 Fura, Ingredients, methods of preparation and picture

2.4 Kunun Zaki, Ingredients, methods of preparation and picture

2.5 Koko/Akamu, Ingredients, methods of preparation and picture

2.6 Jiko/Salala, Ingredients, methods of preparation and picture

2.7 Burkutu/Pito, Ingredients, methods of preparation and picture

2.8 Sorghum Malt, methods of preparation and picture

2.9 Kasari, Ingredients, methods of preparation and picture

2.10 Madi, Ingredients, methods of preparation and picture

2.11 Kafa, Ingredients, methods of preparation and picture

2.12 Gwaragi, Ingredients, methods of preparation and picture

2.13 Zambu, Ingredients, methods of preparation and picture

2.14 Tuwon Dawa, Ingredients, methods of preparation and picture

2.15 Tuwon Ruwa/Madi, Ingredients, methods of preparation and picture

2.16 Tuwon Bula, Ingredients, methods of preparation and picture

2.17 Pate-Pate, Ingredients, methods of preparation and picture

2.18 Sorghum (zagagi), Ingredients, methods of preparation and picture

2.19 Danbu, Ingredients, methods of preparation and picture

2.20 Iwara, Ingredients, methods of preparation and picture

2.21 Masa or Waina, Ingredients, methods of preparation and picture

2.22 Hoche, Ingredients, methods of preparation and picture

2.23 Sorghum samosa Ingredients, methods of preparation and picture

2.24 Mashe, Ingredients, methods of preparation and picture

2.25 Dakuwa, Ingredients, methods of preparation and picture

2.26 Pop Sorghum, Ingredients, methods of preparation and picture

2.27 Sorghum Groundnut Crunch Snacks Ingredients, methods of preparation and picture

2.28 Sorghum Composite cookies, Ingredients, methods of preparation and picture

2.29 Sorghum muffins, Ingredients, methods of preparation and picture

2.30 Sorghum Composite bread/bread rolls, Ingredients, methods of preparation and picture

2.31 Sorghum Composite Cakes, Ingredients, methods of preparation and picture

2.32 Sorghum Composite Dough nuts, Ingredients, methods of preparation and picture

2.33 Pasta and noodle

3.0 SORGHUM AN AMAZING NUTRITIOUS CEREAL

ICRISAT Highlight

## **FADAMA III-AF**

Fadama III-Additional Financing project is designed to support clusters of farmers in selected states with comparative advantage and high potential to increase production and productivity of Cassava, Rice, Sorghum and Tomatoes value chains and link them to better organized markets within the selected states and Staple Crop Processing Zone (SCPZ).

- ▶ Fadama III- AF project has risen to the challenge of bridging this gap by adopting the concept of agribusiness management in the implementation of the selected crops value chain under the then agricultural transformation agenda (Tomato, rice, **sorghum**, & cassava).
- ▶ Fadama III AF Project was given a mandate to promote production, processing and marketing in **Sorghum Value Chains** as part of the Project objective toward increasing income of Fadama Users on a sustainable basis.

In the light of this, Fadama Coordination office established a solid collaboration with ICRISAT as a Technical Partner to Fadama on **production, processing** and **marketing** of sorghum among Fadama Supported Farmers across the implementing States. To further promote sorghum consumption especially among the urban populace and working mother, a guide to modern and traditional recipe of sorghum and sorghum based foods will facilitate its adoption. Therefore, Fadama III-AF has produced this **Hand Book** targeted for value addition through processing, better nutritious product and market linkages. It is hope that all will find it useful either for preparation of household nutritious sorghum and sorghum based foods or for income generating activities.

## 1.0 INTRODUCTION

Sorghum is one of the top cereal crops in the world that is extremely drought tolerant and excellent choice for arid and dry areas, it was originally cultivated in Africa, although the cultivation of this grain is on the rise, it has spread to southern Asia and the Americas. This annual grass has special adaptations to weather extremes and is a very stable source of nutrition. In much of the rest of the world, however, it is consumed by humans as well as animals.



**Plate 1:** Picture of Sorghum grains on their stalks

Sorghum packs healthy benefits in every grain. The super grain is high in protein, rich in antioxidants and naturally gluten-free. Sorghum helps keep someone fuller, longer and provides beneficial dietary fibre for digestive health. Several varieties of sorghum are grown all over Nigeria. Sorghum is an extremely versatile grain that can be served cooked or whatever option one prefer to prepare their favourite meals. Sorghum grain is packed full of the nutrients needed to stay healthy; the protein provides the building blocks for bone, muscle, skin and enzyme development, Iron strengthens the immune system and oxygen-carrying capacity in the blood, Vitamin B6 is integral in synthesizing antibodies and enhancing nerve function, Niacin provides improved blood circulation, Magnesium aids in calcium absorption and body temperature regulation and Phosphorus helps form healthy bones.

Sorghum is favoured by the gluten intolerant and is often cooked as a porridge to be eaten alongside other foods. The grain is fairly neutral in flavour, and sometimes slightly sweet. This makes it well adapted to a variety of dishes, because, it absorbs flavours very well. It can also be eaten plain. The grain is commonly eaten with the hull, which retains the majority of the nutrients. The plant is very high in fibre and iron, with a fairly high protein level as well. This makes it well suited to its use as a staple starch in much of the developing world.

Therefore, the need to develop and introduce more Sorghum grain product development for value addition through processing, better nutritious products and linkages to improve farm profits and incomes are critical for enhanced productivity along the continuum from subsistence to commercial agriculture.

It is in view of the above that ICRISAT Nigeria and partners are poised with the massive promotion of Sorghum recipes for good health, income generation and job creation along the value chain.

## 2.0 SORGHUM AND SORGHUM BASED RECIPES IN NIGERIA

### 2.1 SORGHUM FLOUR

Sorghum flour is an important powder obtained by milling sorghum into fine powder, it can be used in preparing other products, it is also an ingredient used in the manufacture of confectioneries such as bread, biscuits, crackers, cakes, couscous, infant foods, cookies etc. It is also used as thickeners in some foods.



**Plate 1:** Decently Packaged Sorghum Flour produced by ICRISAT

#### Preparation

- Removal of dirt, stones or any foreign particles from the grain sorghum.
- Grain is then de-husked or milled directly.
- The de-husked grain is washed with water and allowed to dry for few hours.
- The de-husked grain is milled into fine flour.
- Sieved using a sieve aperture of 180 microns or 125 microns for coarse flour.

The flour is stored in air tight containers until required.

## 2.2 SORGHUM COMPOSITE FLOURS

Composite flour referred to the process of mixing cereal flour with legume flours. Diluting wheat flour with Sorghum and root crops flours (yam, cassava, potato) was found to be desirable to reduce importation of wheat into the country. When sorghum is used for bread-making, addition of bread improvers or modification of the bread-making process is needed. A higher level of substitution is possible with hard than with soft wheat.



**Plate 2:** A well packaged Sorghum Flour by El-shaddal Foods and Northern Nigeria Flour Mill

### Preparation

- Sorghum milled at 80 percent extraction rate
- The flour could be blended with white wheat flour for bread making without any adverse effect.
- Milling at 72 to 75 percent extraction rate yielded fine sorghum flour that is more suitable for bread-making.
- Breads can also be made with 30 percent sorghum flour and it is found to be comparable to 100 percent wheat bread.
- 55percent sorghum could be used for biscuits without adversely affecting biscuit quality.



### 2.3 FURA

Fura is an unfermented, steam-cooked dough primarily made from sorghum, millet or a combination of the two. *Fura* is usually taken with milk, yoghurt or raw milk (*nono/kindirmo*).



**Plate 3:** Mashed and Unmashed Fura to be mixed with milk and sugar

#### Ingredients

- 3 cups properly sorted and cleaned Sorghum or millet grain
- ½ teaspoon of Grinded pepper
- ½ teaspoon of Grinded cloves
- ½ teaspoon of Grinded ginger
- 5-10 cups of water
- 4 cups of raw cow milk (*nono*), yogurt
- Sugar to taste

#### Preparation

- Grind the sorted and clean sorghum or millet grain to flour
- Mix the flour and spices (pepper, cloves, ginger) together in a bowl.
- Sprinkle some quantity of water to the mixture, sufficient as a binding agent for the dry ingredients.
- Mold into medium sized balls.
- Place some quantity of water on fire to boil
- Drop the molded balls into the boiling water and leave to cook for about 20-30 minutes.
- Transfer the cooked balls from the pot into a mortar and pound thoroughly.
- Re-mold them once more into small balls
- Sprinkle with sorghum/millet flour to keep the balls moist
- To serve; pour the raw milk (*nono*) and the balls into a bowl, mash them together and add Sugar to taste

## 2.4 KUNUN ZAKI

Kunun zaki is a non-alcoholic beverage. It is a thin porridge prepared from sorghum, millet or mixture of the two. It is a popular drink that is normally served chilled for home consumption and also produced commercially and sold in both rural and urban areas of Nigeria.



**Plate 4:** Ready to be consumed Kunun Zaki

### Ingredient

- 3 cups of sorted and clean Sorghum grain
- ½ tea spoon of grinded Ginger/gloves
- 10-15 cups of Water
- 1 small sized Sweet potato (dried pellets)
- ½ tea spoon of Pepper/ other spices (optional)

### Method of Preparation

- Soak the sorted and clean sorghum grain in water overnight.
- Mill into a fine paste with the sweet potato pellets, ginger, gloves (and other spices)
- divide paste into two halves
- bring water to boil
- pour boiling water to one part and stir to avoid lumps
- allow to cool a bit
- add the second part of the paste to the first and stir well
- Sieve the paste with Muslin cloth
- Add sugar/honey to taste (optional)

## 2.5 KOKO/AKAMU

This is made from sorghum or millet. The product is consumed warm or cool along with bean cake (Kosai/Akara) to obtain protein enriched diet. It is ideal as an infant's food when complemented with a rich protein source like soya bean flour and/or milled groundnut. It is produced commercially and usually served hot.



**Plate 5:** Ready to drink Koko

### Ingredients

- 5 cups of well sorted and clean Sorghum grains
- 10-15 cups of Water
- Sugar/ honey to taste
- Milk (optional)

### Preparation

- Soak the sorted and clean sorghum grains overnight in water
- Wash properly and mill wet
- Add water to make a very thin mixture
- Sieve using muslin or cheese cloth and allow to settle
- Decant the water to obtain the paste.
- Bring fresh water to boil
- Mix the paste with normal water to make a light consistency mixture
- Pour the boiling water into the mixture and stir vigorously to avoid lumps until gelling forms
- Add sugar/ honey to taste
- Add milk (if needed)
- Serve hot

## 2.6 JIKO/SALALA

This is a sorghum product used as stimulant or analgesic to enhance the working abilities of farmers and other users particularly during the farming season. It is also served as a medicinal drink.



### Ingredients

- 2 cups of well sorted and clean sorghum grain
- Ginger as desired
- Pepper as desired
- Medicinal roots/herbs

### Method of Preparation

- Soak the roots or herbs in water for about 7 days until when decomposition sets in and signs of microbial growth are noticed
- Remove the herbs/roots and retain the water
- Grind the sorted and clean sorghum grains into flour
- Boil some quantity of water in a pot
- Mix the grinded sorghum flour and the herbs water in a clean container
- Pour the boiled water on the mixture to make gruel
- Add the ginger and pepper

## 2.7 BURUKUTU/PITO

Burukutu is an alcoholic beverage brewed from the sorghum grain, the beverage is often produced as a traditional or local wine. It is consumed in most part of northern Nigeria at social gatherings and also sold commercially.



**Plate 7:** Burukutu/Pito traditional alcoholic drink

### Ingredients

- 5 cups of properly sorted and clean sorghum grains
- 10-15 cups of water

### Method of Preparation

- Soak the sorted and clean sorghum grain in water for 2 days (48 hours)
- Allow for germination for 5 days (malt)
- Sun dry the malted sorghum
- Mill the dried malted sorghum
- Boil the gruel for 3-4 hours and allow to cool
- Filter the gruel using a muslin cloth
- Re-boil the filtrate and allow to cool
- The filtrate is then fermented to ‘pito’.
- Transfer the remaining cool filtrate to a fermentation pot and keep in a warm environment

Fermentation occurs after about 12 hours and this is ‘burukutu’

## 2.8 SORGHUM MALT

Malting is a process of converting sorghum grain into malt. It is important in brewing and malt companies whose sole responsibility is to malt sorghum and sell. The malt can be converted into malt drink which is a non-alcoholic drink and also into beer or wine as an alcoholic drink. It is produced industrially and commonly sold at both the rural and urban communities.



**Plate 8:** Refreshing Sorghum malt drink

### Ingredients

- 5 cups of properly sorted and clean sorghum grains
- 10-15 cups of water
- Polythene nylon

### Method of Preparation

- Soak the well sorted and clean sorghum grains for 2 days
- Wash thoroughly, drain and spread out on a polythene
- Cover with a layer of polythene to create a warm and humid environment that will enhance germination
- Allow to sprout for 3-5 days
- Sun dry the sprouted grains

Mill the germinating sorghum grains into powder

## 2.9 KASARI

Kasari is a drink which can be taken in either unfermented or fermented form. It is a by-product of washed de-husked sorghum. It is normally given to livestock to drink for enhanced fattening process and also to make the animals stronger. Humans also take kasari in the fresh form or in the fermented form for reasons ranging from habits, refreshing drinks and for medicinal purposes. It is common in Zamfara and Sokoto States.



**Plate 9:** Kasari medicinal Drinks

### Ingredients

- 5 cups of well sorted and clean sorghum grain
- 10-15 cups of water

### Method of Preparation

- De-husk the sorted and clean sorghum grains
- Wash the de-husked sorghum in water and dry
- Processed into various products
- The water left after washing is known as kasari

It is actually a rich by-product which contains the testa, aleurone layer, reasonable quantities of broken endosperm and most of the germ of cereal gram

## 2.10 MADI

Madi is a food prepared from sorghum paste. It is commonly consumed with kosai, meat or stew. It is prominently consumed by Nupe people in Niger, Kogi, Kwara and Abuja. It is a meal that can take 2-3 days not spoil.



**Plate 10:** Madi Delicacy

### Ingredients

- 5 cups of well sorted and clean Sorghum grains
- Banana Leaves
- 10-15 cups of Water

### Method of Preparation

- Put your another water to boil
- Add your mixture (paste) gradually to the boiled water on fire.
- Stir consistently till it becomes strong on fire
- Stop adding more residue when its strong
- Add sugar to taste, if needed
- Serve on clean dried leaves
- Wrap them well in the leaves then put clean water in a bowl and put your wrapped madi into the water and leave for 10 to 20 mins
- Ready to eat either at that moment or it can take another 2 to 3 days which looks or tastes better. It is served and eaten like that or with kosai, meat or stew just like kafa.



## 2.11 KAFA

Kafa is a meal taken with stew, bean cake (kosai), or moin moin. It is better served cold in broad leaves and can be eaten at any time of the day as meal or snacks.



**Plate 11:** Kafa Sorghum meal to be served with stew/kosai

### Ingredients

- 5 cups of properly sorted and clean sorghum grains
- Broad leaves
- 10-15 cups of Water

### Method of preparation

- Soak the sorted and clean sorghum grains in water
- Wet mill the sorted and clean sorghum
- Sieve the milled sorghum to remove bran then allow to settle
- Boil water on fire
- Take small quantity in a container as far need and mix with water to form paste
- Consistently add the mixed paste to the boiled water
- Stir gently till it turns strong while still on fire till it cooks
- Reduce the heat to avoid it getting burnt
- Wash and clean the leaves
- Scoop the kafa into the leaf and wrap gently
- Ready to serve hot or cold
- It is also called agidi

## 2.12 GBARAGI

Gwaragi is a delicacy usually taken as snacks. It is an energy given food mostly served cold. The recipe is appropriate for both young and old to be taken as lunch and dinner.



**Plate 12:** Gbaragi meal

### Ingredients

- 5 cups of properly sorted and clean sorghum grains
- 10-15 cups of Water
- Clean broad leaves (Dinci fini leaves)
- Sugar/honey

### Method of Preparation

- Wash the well sorted and clean sorghum grains
- Soak the sorghum till the next day to soften it
- Remove and wash so that it will be stone free
- Mill the washed grain
- Sieve with clean water and muslin sheets to get a good residue
- Allow the sieved paste to settle down and remove the water from it
- Boil some water
- Scoop some of the residue and mix with little water. Add sugar to taste and keep aside
- Gently pour the mixed residue into boiling water continuously and gradually stir on fire till it is strong
- Simmer the leaves in water for about 5 minutes to allow it soften and kill any associated microbes
- Wash the leaves in cool water and wipe dry
- The Gbaragi is scooped on the leaves before folding the leaves and allowed to cool off as it solidify
- It is eaten like that in the leaves but with nothing

### **2.13 ZAMBU**

Zambu is a meal taken with soup mostly as lunch. It is an energy rich recipe that can be taken by children and adult just like other solid meal to enhance growth. It is appropriately served warm.



**Plate 13:** Zambu sorghum meal

#### **Ingredients**

- 5 cups of properly sorted and clean sorghum grain
- 10-15 cups of Water

#### **Method of preparation**

- Mill the sorted and clean sorghum grains
- Sieve the milled sorghum
- Clean the sieved sorghum residue
- Place some quantity of water on fire to boil
- Mix the residue with some lukewarm water
- Gradually add the mixed residue to the boiling water till it thickens and stir till it cooks

Serve to eat with any kind of soup or stew

## 2.14 TUWON DAWA

This is a common dish in Nigeria. In some cases, a little bit of cassava flour may be added to enhance the binding quality. It can be eaten with any soup of choice e.g. Okro, Vegetable, melon (egusi), or baobab leaves (Kuka) soup.



**Plate 14:** Prepared Tuwon-Dawa awaiting stew

### Ingredients

- 3 cups Sorghum grain
- 5 cups of Water
- 1 table spoon of potash (kanwa) powder

### Method of Preparation

- Wash your hands clean with any good hygienic detergent of your choice
- Mill the sorted and cleaned sorghum grain into flour
- Sieve the flour to remove grits
- Put 2½ cups of water into a medium pot and set on a medium heat to boil.
- Add a table spoon of kaun powder (cooking potash powder) to the boiled water.
- Mix half cup of sorghum flour with normal water to make a thin paste using a spatula.
- Pour the thin paste into boiling water and stir vigorously to prevent lumps.
- Allow to cook and thicken (gel) for about 20 minutes.
- Add the remaining flour (Quantity as far need), little at a time with constant stirring.
- Stir and turn very well until a smooth/homogenous thick paste is obtained.
- Add a little hot water then cover the paste, lower the heat and allow it to cook for another 5-10 minutes.
- Scoop the prepared paste into plates and serve with the appropriate soup of choice.

## 2.15 TUWON RUWA/MADI

It is a smooth thick paste processed from sorghum. It is also eaten with any soup of choice.



**Plate 15:** Tuwon Madi awaiting soup

### **Ingredients**

- 5 cups of Sorghum grain
- 10- 15 cups of Water

### **Method of Preparation**

- Sort and wash the sorghum grains.
- Soak grains in water for about 3 hours
- Wash and rinse the soaked grains properly
- Wet mill into fine paste
- Sieve using a muslin cloth
- Allow the mixture to settle
- Decant the top water
- Store the paste in a container.
- Put water on fire and allow to boil
- Make a slightly thick mixture of the paste with water
- Pour the mixture into the boiling water and stir constantly until a glossy thick paste is obtained.
- Scoop out into a normal water on smaller size

Serve with any soup of choice or grinded pepper and oil.

## 2.16 TUWON BULA

Tuwon bula is a delicacy prepared from milled sorghum. It is a nutritious meal commonly consumed with vegetable and okro soup or groundnut cake with oil. It is prominently consumed in Kebbi and Zamfara state as breakfast or dinner. It is preferably served hot.



**Plate 16:** Tuwon Bula with soup

### Ingredients

- 5 cups of properly sorted and clean Sorghum grains
- 1 cooking spoon of Groundnut or palm oil
- Grinded pepper as desired

### Method of preparation

- Soak the sorted and clean grains in water for about 24 hours
- Mill the soaked grains into paste
- Sieve the milled paste using muslin or cheese cloth and allow to settle
- Decant the water to obtain the paste
- Put water on fire to boil
- Pour the decanted paste on the boiling water until a thick homogenous paste is obtained
- Use a calabash with normal water to mould into balls of suitable sizes
- Bula is normally left in water
- It is eaten with appropriate vegetable or okro soup
- Alternatively, it may be taken with groundnut cake and oil

## 2.17 PATE-PATE

This is a type of porridge prepared from coarsely milled sorghum. It is a very popular household food in northern Nigeria. Cowpea or local beans may be added to enhance the nutritional content.



**Plate 17:** A well-cooked Pate Pate awaiting consumption

### Ingredients

- 3 cups of well sorted and clean Sorghum grains
- 500g of Beef/dried fish
- Pepper as desired
- Sliced/grated Onion
- 2 plum Tomatoes
- 2 bunches of Fresh spinach (chopped)
- 1 cooking spoon of Palm/groundnut oil
- Small quantity of Locust beans/ dawa dawa (optional)
- 3 small cubes of Seasoning
- 3 tablespoons of grounded crayfish
- Salt to taste
- 10 cups of Water
- 1 cup of Beans

### Method of preparation

- Grind the sorghum coarsely to obtain grits
- Wash meat or fish, cut into sizeable portions and boil with salt until tender.
- Add palm/groundnut oil to the boiled meat or fish
- Steam the meat/fish with 1 cube of seasoning.
- Slice all the ingredients (tomatoes, onions, pepper) and add to the cooked meat
- Boil for another 5-10 minutes.
- Wash the sorghum grits; add to the boiling mixture and stir.
- Add the chopped and rinsed spinach then allow to steam for 5-10 minutes.
- Cook beans to tender separately then add to the mixture and boil for 5-10 minutes if needed
- Serve warm

## 2.18 ZAGAGI

Zagagi is an indigenous meal rich in carbohydrate and protein. It is mostly taken as breakfast or dinner. The recipe is appropriate for all age, especially for growing child due to the mixture of beans, meat and fish. Appropriate to consume hot.



**Plate 18:** A well prepared zagagi

### Ingredients

- 3 cups of well sorted and clean Sorghum grain
- 500 g Meat/fish
- 3 pieces each of Tomato and pepper
- 1 small size onion
- 1 cooking spoon of Palm oil/groundnut oil
- 2 cubes of Seasoning
- salt to taste
- 1 cup of Beans

### Method of Preparation

- Wash and clean the properly sorted sorghum
- De-hull the sorghum and boil until it is soft
- Sort, clean and boil beans until it is soft
- Separately boil the meat/fish with other ingredients (salt, seasoning, onions, tomato, pepper and oil)
- Pour the soft boiled sorghum and beans into the boiled meat/fish and other ingredient
- Allow to steam for 5 minutes, stir and serve hot



## 2.19 DANBU

Danbu is a sorghum delicacy mostly taken as breakfast. It is rich in carbohydrates, protein and fats and oil. Danbu is a meal appropriate for young and adult.



**Plate 19:** Danbu Delicacy

### Ingredients

- 5 cups of well sorted and clean Sorghum grains
- 2-3 bunches of Vegetables (Moringa, senna etc.)
- 1 big rows of onions
- 1 plum Tomato
- 3 pieces of pepper
- 1 tablespoon of Salt
- 1Seasoning
- 1 teaspoon of ground Spices
- 1 cooking spoon of Vegetable oil

### Method of Preparation

- Clean and wash sorghum grain
- Mill the grain into coarse particles
- Soak the milled grain in water
- Add onion, tomato, pepper, spices and seasoning to the soaked coarse grains
- Put a pot on fire with small quantity of water and heat
- Transfer the mixture into another pot
- Put the pot of the ingredients on top of the other pot on fire and heat by steaming until the grains are tender

Vegetables like moringa (zogalle), senna (Tafasa) or spinach are then added and allowed to steam for 10-15 minutes

## 2.20 IWARA

Iwara is an energy given food also rich in vitamins and fat and oil. It is a meal that is serve warm and can be taken as breakfast, lunch or dinner.



**Plate 20:** Iwara delicacy

### Ingredients

- 5 cups of sorted and clean sorghum grain
- 1 teaspoon of grounded spices
- Pepper as desired
- 2 cubes of Seasoning
- Salt to taste
- 10-15 cups of Water
- 1 cup of Beans
- 1 cooking spoon of palm oil

### Method of preparation

- Grind the sorted and clean sorghum grain into powder
- Sieve to remove the grits and debris
- Place water on fire and allow to boil
- Pour the sieved powdered grain into the boiled water and stir vigorously
- Add salt, seasoning and pepper
- Allow the mixture to steam at low heat for 30min
- Mix with boiled beans
- Add palm or groundnut oil and allow to cook for 3-5 minute
- Serve warm

## 2.21 MASA OR WAINA

This is a traditional fermented product fried in local earthen or aluminium frying ware with cocottes made from sorghum (millet, maize, rice or a combination of any). It is usually served as breakfast and sometimes lunch with vegetable soup, spices or stew.



**Plate 21:** Prepared Waina awaiting soup or seasoning powder addition before consumption

### Ingredient

- 3 cups of well sorted and cleaned Sorghum grains
- 1 tablespoon of potash
- 4 tablespoons of groundnut oil
- Chopped Onions
- Potash (optional)
- Chopped fresh pepper
- $\frac{1}{4}$  tablespoon of yeast
- 1 tablespoon of flour for baking (optional)
- 2 tablespoons of Sugar
- half teaspoon of Salt

### Method of Preparation

- De-hull the sorted and cleaned sorghum grains
- Soak the de-hulled grains in water overnight.
- Wash soaked grains in clean water and drain.
- Grind while the grains are slightly damp.
- Dissolve yeast in warm water; pour into the grinded sorghum paste and leave for 15 minutes to rise.
- Sieve the grinded sorghum paste to remove grits. Boil the grits to half cooked and allow to cool.
- Put the dissolved yeast in a large mixing bowl. Add the potash, salt and the chopped onions and mix very well.
- Mold in the flour and the grits to a dropping consistency for 3 minutes until mixtures rises.
- Beat mixture again by vigorous stir to incorporate air.
- Heat the cocotte with a little oil.
- Scoop in some amount of mixture and allow to cook.
- Turn each waina over to cook the top.
- Allow each side to cook well until it turns light brown.

Serve masa for breakfast or dinner with egg stew, vegetable soup or any protein of choice.

## 2.22 HOCHE

Hoche is a slightly fermented sorghum product prepared and eaten in northern Nigeria. It is a traditional food of Zamfara, Kebbi and Sokoto state people.



**Plate 22:** Hoche Sorghum snacks

### **Ingredients**

- 5 cups of properly sorted and clean sorghum grains
- 10-15 cups of water

### **Method of Preparation**

- De-husk the sorted and clean sorghum grain
- Soak the de-husked grains in water for about 24hours
- Wash the soaked de-husked sorghum grain in clean water and drain in a sieve
- Grind while the grains are still damp
- Pour the paste into local earthen pots or wares to which some vegetable oil has been applied
- Place the pots on local oven, cover with cloth and cook until all sides of the hoche are well cooked (golden brown)
- It is normally taken with stew or vegetable soup

### 2.23 SORGHUM SAMOSA

Samosa is a common snack originally made from wheat flour, however it is also made from 100% sorghum flour as well as from composite flour of sorghum wheat or sorghum soybean.



**Plate 23: Sorghum samosa**

#### **Ingredients**

- 1 cup of Sorghum Flour
- 1 cup of maida
- 1 cup potatoes
- Boiled peas
- Onion
- Green chillies
- Curry leaves as required

#### **Method of Preparation**

- Take one cup of sorghum flour and one cup of maida. Mix well and add required amount of water to make dough
- Make small balls and spread the dough with roller stick and cut into halves.
- Mash boiled potatoes, add chopped onions, green chillies and curry leaves.
- Make seasoning with chopped onions, green chillies, curry leaves and boiled mash potatoes, boiled peas and salt to taste.
- Fill the above mixture in each half and fold in triangular shape and deep fry
- Serve hot with tomato sauce or spices

## 2.24 MASHE

Mashe is a recipe rich in carbohydrate and fat and oil. It is a snack appropriate for old and young, usually serve warm.



**Plate 24:** Mashe delicacy

### Ingredients

- 5 cups of properly sorted and clean sorghum grain
- 10-15 cups of water
- 1 medium sized Sweet potato
- 75cl of Oil
- Sweetener (optional)

### Methods of preparation

- De-husk the well sorted and clean sorghum grains
- Soak the de-husked grains in water till it ferments
- Wet mill the fermented grains with sweet potato
- Stir well to form a thick homogenous paste
- Put oil on fire in a frying pan
- Drop into hot oil (deep frying)
- Ready to eat

## 2.25 DAKUWA

This is a recipe taken as snacks at any time of the day. It is a carbohydrate based snacks rich in vitamin and fat and oil, suitable for children and adults.



**Plate 25:** Dakuwa sorghum snacks

### **Ingredient**

- 2 cups of sorted and clean sorghum
- 1 cup of groundnut
- pepper as desired
- Sugar/ honey to taste
- 1 teaspoon of spices
- A pinch of Salt

### **Methods of preparation**

- Roast the groundnut and sorghum for about 30 minutes
- Finely grind the groundnut and sorghum together into powder
- Grind the pepper and other spices to powder
- Mix all together thoroughly with warm water to form a thick paste
- Add sugar and salt to taste
- Roll to balls or any shape
- Allow to cool and serve

## 2.26 POP SORGHUM (Guguru)

Pop sorghum is a snack desirable to children and can be taken by adults as well at any time. It is prepared with oil, sugar and salt making it rich in vitamin A, fat and oil.



**Plate 26:** Pop Sorghum Snacks

### Ingredients

- 2 cups of well sorted and clean sorghum grains
- 1 tablespoon of butter/oil
- Sugar/ honey to taste
- pinch of salt

### Method of preparation

- Clean, wash and dry the sorghum grain
- Put the pot on fire to heat
- Put the two tablespoons of oil in the pot
- Pour in the grains and sugar/salt in the pot
- Turn the heat down to medium and cover
- Shake the pot until the grains begin to pop
- When the popping has slowed to 7-8 seconds between pops, remove the pot from the heat and serve



## 2.27 SORGHUM COMPOSITE GROUNDNUT CRUNCH

Sorghum composite crunch are enriched snacks preferred by children. It can be taken at any time of the day, served with any cool drinks. Flours are made from sorghum grains alone or mixed with wheat flour making it more palatable to eat.



**Plate 27:** Sorghum Groundnut Crunch Snacks

### Ingredients

- Sorghum flour
- 1 cup of Wheat flour (optional)
- Raw groundnut
- Baking powder
- Walnut (optional)
- Raw egg
- Sugar / honey
- Groundnut oil

### Method of Preparation

- Put a pinch of baking powder into sorghum flour/composite sorghum flour
- Pour the sugar into egg and mix thoroughly
- Sift all dry ingredients together and set aside
- Pour the egg into groundnut and add flour
- Continue until groundnut is coated with flour
- Fry in groundnut oil

When cool as snacks

## 2.28 SORGHUM COMPOSITE COOKIES

Sorghum composite cookies are enriched snacks preferred by children. It can be taken at any time of the day, served with any cool drinks. Flours are made from sorghum grains mixed with cassava/wheat flour making it more palatable to eat.



**Plate 28:** Sorghum Cookies Snacks

### Ingredients

- 2 cups of Sorghum flour
- 1 cup of Wheat flour
- 100g of Butter
- half cup of Sugar / honey
- vanilla Flavour (1 cap full)
- 1 small size of Nut meg
- 2 large Eggs
- 1 teaspoon of Baking powder

### Method of Preparation

- Sort and clean sorghum grains from any dirt
- Wash and de-husk grains
- Winnow and mill the de-husked dirt free sorghum into flour
- Sieve with a fine sieve
- Sift all dry ingredients together and set aside
- Cream butter and sugar together till fluffy
- Add flavour and eggs and beat thoroughly
- Combine the dry and wet ingredients together and mix into dough (not too soft or too stiff, but pliable)
- Roll out on a floured board and cut into attractive shapes, or use a cookie cutter

**Note:** The coarse, sieved residue can be used for the preparation of pate-pate, dambu etc, described in earlier recipe. Bake at 250°C for 30minutes or till golden brown.

## 2.29 SORGHUM MUFFINS



**Plate 29:** Sorghum composite dough nut snacks

### Ingredients

- 1 cup of Sorghum Flour
- 1 cup of wheat flour
- 2 teaspoon baking powder
- ¼ teaspoon baking soda
- 1 tablespoon cocoa powder
- 1 teaspoon of vanilla essencet
- 1 tin or 400 ml condensed milk
- 1 cup of milk
- 3-4 tablespoons melted butter

### Method of Preparation

1. Sift the sorghum flour, wheat flour, baking powder cocoa and baking soda in a bowl.
2. In another bowl, mix the condensed milk, milk and vanilla essence and the melted butter and mix thoroughly.
3. Add the wet ingredients to the flour mixture and mix only until the ingredients are well combined.
4. Grease the muffin cups with little oil and spoon and the batter till three-fourths full
5. Place in a preheated oven and bake at 180°C for 30-40 minutes or till a toothpick inserted comes out clean.

### 2.30 SORGHUM COMPOSITE BREAD OR BREAD ROLLS

Sorghum composite bread is an enriched meal mostly taken as breakfast and sometimes as snacks. Flours are made from sorghum grains mixed with cassava/wheat flour, making it more palatable and fluffy to eat.



**Plate 30:** Sorghum Composite Bread roll

#### Ingredients

- 2 cups of Sifted sorghum flour
- 1 cup of Wheat Flour
- 200g of Butter
- half cup of Sugar/honey
- 2 large Egg
- 1 teaspoon of Yeast
- a pinch of Salt

#### Method of Preparation

- Add little amount of sugar to the yeast in a cup of warm water,
- Pour all the ingredients in a mixer and beat at high speed for 10 to 15minutes
- If mixing by hand, continue mixing vigorously until it forms a soft and smooth ball or dough
- Knead into ball, cover in a warm place, till it doubles in size. This is for fermentation.
- Knock back the dough by heating several times on an oven surface and roll into different shapes and sizes
- Brush the surface of the shaped dough with raw beaten egg to achieve a golden brown colour
- Put into oven bread pans and bake at 350°C for 20- 25 minutes or till golden brown.

### 2.31 SORGHUM COMPOSITE CAKES

Sorghum composite cakes are enriched snacks preferred by children. It can be taken at any time of the day, served with cool drinks like milk, kunnu zaki, fura etc. Flours are made from sorghum grains mixed with cassava/wheat flour making it more palatable to eat.



**Plate 31:** Sorghum composite cake snacks

#### Ingredients

- 2 cups of Sifted sorghum flour
- 1 cup of Wheat flour
- 200g of Butter
- 1 levelled cup of Sugar
- 3 large Eggs
- vanilla Flavour (1 cap full)
- small sized Nut meg
- 1 full teaspoon of Baking powder

#### Method of Preparation

- Sort sorghum grains from dirt
- Wash and de-husk grains
- Winnow and mill the de-husked sorghum grains into flour
- Sieve in fine sieve at least 3 times
- Sieve all dry ingredients together and set aside
- Cream butter and sugar together till fluffy
- Add eggs and flavour beat well
- Combine the dry and wet ingredients together and mix well, to give a smooth dropping consistency
- Rub cake containers with groundnut oil and pour the mixture into each
- Bake at 250° or till golden brown

### 2.32 DOUGHNUTS

Sorghum doughnuts is a carbohydrate rich snacks taken everyone at any part of the day. Though, mostly preferred by children.



**Plate 32:** Sorghum composite dough nut snacks

### **Ingredients**

- 2 cups of Sorghum Flour
- 1 cup of wheat flour
- half cup of Sugar/ honey
- 100g of Butter
- 1 large Egg
- 1 teaspoon of Yeast
- small sized Nut meg
- a pinch of Salt
- 75cl of Groundnut oil

### **Method of Preparation**

- Sort sorghum grains from dirt
- Wash and de-husk the sorted sorghum grains
- Winnow and mill the de-husked sorghum grains into flour
- Sieve in fine sieve at least 3 times
- Measure yeast into a cup and add small amount of warm water, with two tablespoons of sugar to activate the yeast for 3 minutes
- Pour all dry and wet ingredients together into a mixer or if mixing by hand pour into a large bowl and mix well till it forms a non-sticky dough
- Cover in a warm place
- Leave to rise until it doubles in size
- punch the dough to deflate it
- knead/fold in for 2 minutes
- cut into desired shape
- allow to rise for 30-45minutes
- Deep fry till golden brown
- Serve hot!!!

### 2.33 PASTA AND NOODLES

Pasta products (noodles) such as spaghetti and macaroni are usually made from flour of wheat. Wheat has a unique property of forming an extensible, elastic and cohesive mass when mixed with water. Sorghum flours lack these properties but can be mixed with wheat. It was found that to obtain products of good cooking quality, it is necessary to add some gelatinized starch to the sorghum flour before extrusion. The pasta quality is influenced by the quality of both the sorghum flour and the starch. White sorghum is preferable for pasta products as its colour is similar to that of wheat flour. A composite flour consisting of 70 percent wheat and 30 percent sorghum produced an acceptable pasta.



**Plate 33:** Sorghum pasta noodles.

### 2.34 CREAM OF SORGHUM SOUP

Sorghum soup is a delicacy and highly nutritious appetiser. It is good for both vegetarian and non-vegetarian diets.



**Plate 34: Sorghum soup**

#### **Ingredients**

- Sorghum grain – 100g
- Roughly cut vegetables (leeks, celery, carrot, onion and turnip) 100 g
- Vegetable stock 100 g
- Dried/smoked fish
- Cray fish
- Seasoning to taste

#### **Method of Preparation**

1. Clean and boil sorghum along with all the vegetables
2. Add a sprig of bouquetgarni (a bunch of herbs, typically encased in a muslin bag, used for flavouring a stew or soup).
3. When all ingredient are well done, remove bouquetgarni
4. Blend it in a mixer and bring back in a pan to re-boil
5. Adjust the seasoning and add a dash of fresh cream
6. Serve it piping hot



## **SORGHUM AN AMAZING NUTRITIOUS CEREAL**

Sorghum, an ancient cereal grain that's a staple crop in India and throughout Africa, has long been considered a safe grain alternative for people with celiac disease and gluten insensitivity. New molecular evidence confirms that sorghum is completely gluten-free, and reports that the grain provides health benefits that make it a worthy addition to any diet. Gluten is the flexible protein in common grains like wheat, barley and rye that give them a chewy, springy quality when baked into breads or pastas. Gluten triggers inflammatory reactions in people with celiac disease or gluten sensitivity that can cause abdominal pain and digestive issues, and eventually lead to joint pain and intestinal damage. Are you suffering from constipation and want to get rid of it immediately? Or does the fear of contracting cancer keep you awake at nights? There is one ingredient that can keep these issues, and many others, at bay!. If you are wondering what is it we are talking about, it is nothing but Sorghum, a grass native to tropical and subtropical climates. Would you like to know the many other Sorghum benefits? Here are 10 benefits of sorghum diets.

### **1. Improves Digestion:**

Sorghum contains a good amount of dietary fiber (48% of the recommended dietary fiber needed daily) and help improve digestion. Dietary fiber is a bulking agent that adds bulk to the stool and helps it pass smoothly through the digestive tract. Sorghum helps improve digestive health and treats conditions like gas, diarrhea, bloating, constipation and stomach ache.

### **2. Anti-Carcinogenic:**

Sorghum's bran layer contains many cancer-fighting and free-radical eliminating antioxidants that are essential for the body. Some of these antioxidants are exclusive to Sorghum and thus, Sorghum becomes an effective anti-carcinogenic. Antioxidants help purge free radicals, which otherwise can change the body's healthy cells into cancer cells.

### **3. Boosts Heart Health:**

Sorghum, as already discussed, is crammed with dietary fiber. The abundant fiber in Sorghum helps reduce LDL (bad) cholesterol from the body and reduces the risk of heart attack and other arterial conditions.

### **4. Gluten Free:**

Celiac disease is a comparatively new condition, which is basically characterized by a gluten allergy that can have severe symptoms. Gluten is a widely used ingredient that makes the life of celiac disease victims quite hard. If you suffer from celiac disease or know someone who does, adding Sorghum and other grains apart from wheat is the best thing to do. You can eat Sorghum without suffering from inflammation, gastrointestinal damage, and nausea.

### **5. Controls Diabetes:**

Sorghum helps you control your diabetic tendencies. Excess carbohydrates usually break down simple sugars and increase the body's glucose levels that often leads to diabetes. Sorghum is rich in tannin, which contains enzymes that prohibit starch absorption by the body. This property helps regulate insulin and glucose levels. A balance in the levels ensures that diabetics don't have to suffer sudden spikes and drops in glucose levels, thereby preventing diabetic shock and other complications.

### **6. Strong Bones:**

Magnesium is one of the major ingredients of Sorghum. Magnesium increases calcium absorption that helps maintain calcium levels, and this in turn helps promote bone health.

Calcium and magnesium help quicken bone-tissue redevelopment and also accelerate the healing of damaged and aging bones. This can in turn help prevent conditions like arthritis and osteoporosis.

#### **7. Improves Circulation:**

Sorghum is rich in many minerals, including iron and copper. Like magnesium boosts calcium intake, copper boosts iron intake. An increase in iron means better oxidization of blood, and this leads to better oxidization of tissues, muscles, organs and the body. This oxidization is a result of RBC production that is boosted by iron. As more RBCs are created, blood circulation continues to improve. The iron levels ensure that you don't contract anemia, which leads to a reduction in RBC production, cell damage, and no cellular growth.

#### **8. Energy Booster:**

Sorghum contains Niacin, also known as Vitamin B<sub>3</sub>, which helps turn food into energy for the body. Vitamin B<sub>3</sub> metabolizes nutrients and helps maintain energy levels throughout the day.

#### **9. Prevents Melanoma:**

One of the most effective health benefits of Sorghum is preventing Melanoma. We know that Sorghum contains many cancer-fighting antioxidants that can help treat cancers. Sorghum is also quite effective in treating melanoma (a special type of skin cancer), which is characterized by pigment-containing cell growth on the body. The tanning in Sorghum may have restrictive effects on melanoma cells.

#### **10. Nutritional:**

Sorghum is crammed with essential nutrients that are not only necessary for development, but also help keep the body free from diseases and maintain its health.

**Now that you know a considerable amount about sorghum nutrition, let us know if you'll give this a try. So, get your hands on some sorghum!!!!!!!!!!!!**

## **ICRISAT HIGHLIGHT**

The International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) is a non-profit, non-political organization that conducts agricultural research for development in the drylands of Asia and sub-Saharan Africa. Covering 6.5 million square kilometers of land in 55 countries, the semi-arid or dryland tropics has over 2 billion people, and 644 million of these are the poorest of the poor. ICRISAT and its partners help empower these poor people to overcome poverty, hunger and a degraded environment through better agriculture. ICRISAT is headquartered in Hyderabad, Telangana State, in India, with two regional hubs (Nairobi, Kenya and Bamako, Mali) and country offices in Niger, Nigeria, Zimbabwe, Malawi, Ethiopia and Mozambique. ICRISAT conducts research on five highly nutritious drought-tolerant crops: chickpea, pigeon pea, pearl millet, sorghum and groundnut. ICRISAT envisions prosperous, food-secure and resilient dryland tropics. To achieve this, its mission is to reduce poverty, hunger, malnutrition and environmental degradation in the dryland tropics. It approaches this through partnership-based international agricultural research for development that embodies *Science with a Human Face*. ICRISAT's strategy is anchored on socio-economic process called inclusive market-oriented development (IMOD). ICRISAT has defined six developmental outcomes that it believes will help the poor to move along the IMOD path: food sufficiency, intensification, diversification, resilience and health & nutrition, and women empowerment. Significant reductions in poverty and increases in food security in the dryland tropics are possible through this route. ICRISAT believes this is the way to meet its inspirational targets of halving the incidence of poverty in smallholder farming households, halving the incidence of hunger, halving childhood malnutrition and significantly increasing the resilience of tropical dryland smallholder farming.

# **FADAMA III-AF**