

Assessment of fonio (*Digitaria exilis*) as a dietary intervention in Northern Ghana



By

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INTRODUCTION

- Fonio (*Digitaria Exilis* and *Digitaria iburua*) is an important cereal in the West Africa Sub – Region and elsewhere. It originated from West Africa and spread to East and Central Africa. Its cultivation is thought to date back to 5000 B.C. (Purseglove, 1988)
- Family: Poacea
- Sub-family: Panicoideae
- Sub-tribe: Digitariinae
- Genera: *Digitaria*

INTRODUCTION CONT...

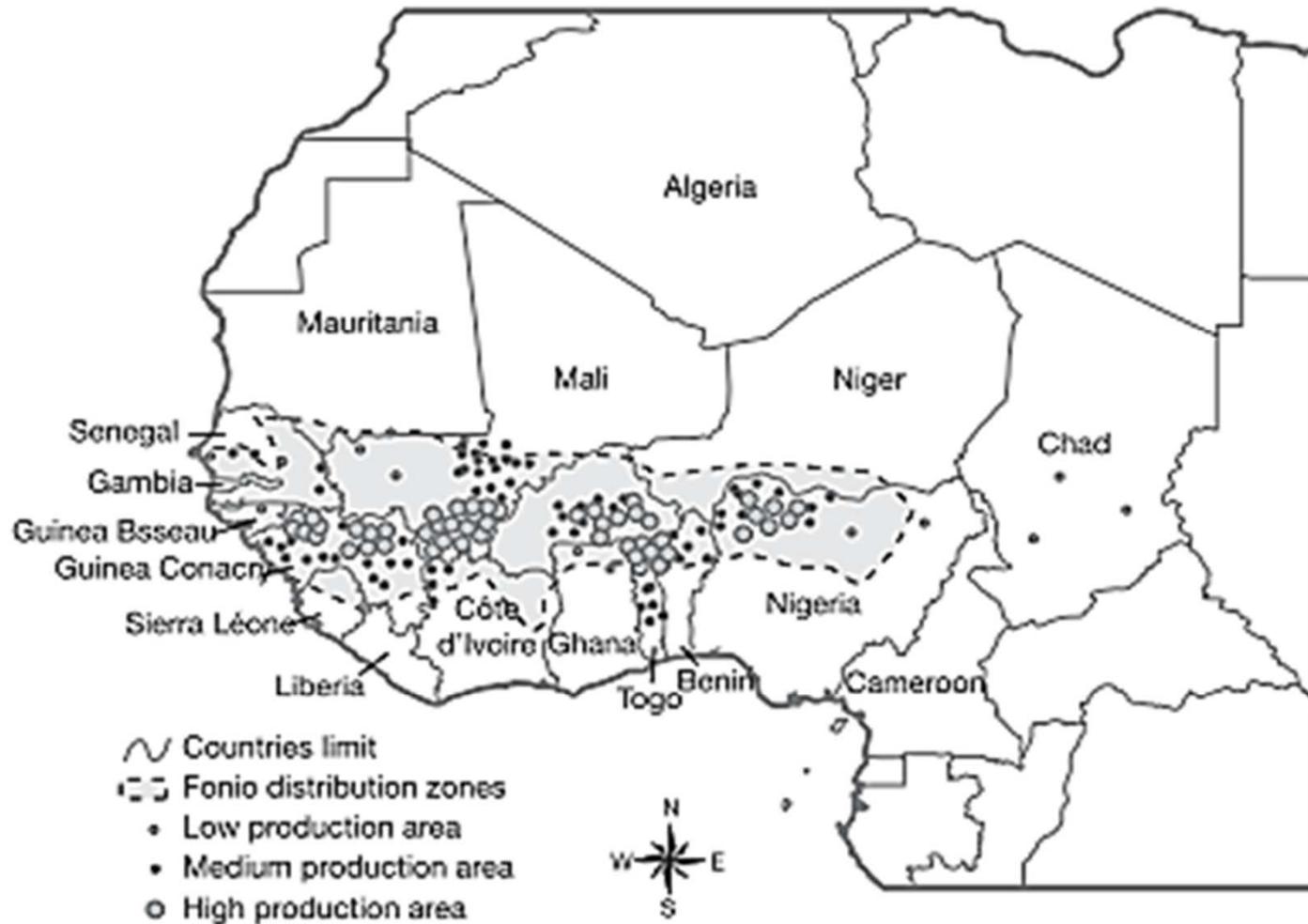


Figure 1: Fonio production areas in West Africa

INTRODUCTION CONT...

Fonio crop growing on the field



INTRODUCTION CONT...



polished fonio (A) and unpolished fonio (B)

IMPORTANCE OF FONIO

- ➔ Fonio is believed to be among the world's tastiest and most nutritive cereal (National Research Council, 1996).
- ➔ It does well in poor marginal soils and matures earlier than the major known cereals hence the name – hungry rice.
- ➔ Fonio provide food to about 4 million people in Africa.
- ➔ Asides digestible carbohydrate, the grain contains essential protein : methionine, cystine, lysine, which are missing in major cereals and highly recommended for expectant mothers and malnourished children.
(CIRD news file, 2009)

SCALE OF PRODUCTION

| COUNTRY | AREA (ha) | PRODUCTION (TONNES) |
|---------------|-----------|---------------------|
| GUINEA | 200,000 | 222,000 |
| NIGERIA | 162,000 | 80,000 |
| MALI | 45,000 | 26,000 |
| COTE D'IVOIRE | 13,000 | 14,000 |
| BURKINA FASO | 13,000 | 9,500 |
| GUINEA BISSAU | 3,500 | 2,000 |
| NIGER | 5,000 | 2,000 |
| SENEGAL | 3,000 | 1,500 |
| GHANA | 2,000 | 500 |
| OTHERS | 1,000 | 500 |
| TOTAL | 451, 000 | 360,000 |

Source : J F Cruz, 2008

NUTRITIONAL VALUE OF FONIO

| Cereal | Protein (%) | | Lipid (%) | | Minerals (%) | | Carbohydrate (%) | |
|---------|-------------|----------|-----------|----------|--------------|-----------|------------------|----------|
| | whole | polished | whole | polished | whole | polished | whole | polished |
| Fonio | 9 – 11 | 7 – 9 | 3.3 - 3.8 | 0.8 – 1 | 1 – 1.1 | 0.3 – 0.6 | 84 – 86 | 89 – 91 |
| Sorghum | 11 | 10 | 3.5 | 1.2 | 1.2 | 0.5 | 84 | 88 |
| Millet | 12 | 11 | 4 | 1.2 | 1.2 | 1.2 | 83 | 87 |
| Maize | 11 | 10 | 4.5 | 1 | 1.3 | 1 | 83 | 88 |
| Rice | – | 8 | – | 0.9 | – | 0.5 | – | 90 |

USES OF FONIO

- ➔ The grain can be processed to prepare jollof, or eaten with stew used to prepare porridge, tuo zaafi, bread biscuit etc. (De lumen *et al.*, 1986)
- ➔ Both the grain and straw are used to feed monogastrics.
- ➔ Fonio is fermented to brew a special beer called “tchakpalo”
- ➔ The straw is also chopped and mixed with clay for construction of farm houses and walls
- ➔ Serves as traditional medicine for diabetic patients.

USES OF FONIO CONT...

Dishes prepared from Fonio



FONIO GRAIN



FONIO JOLLOF

USES OF FONIO CONT...



Bread prepared from fonio flour

PROBLEM STATEMENT

Hunger, which afflicts one in five of the developing world's people for that matter Africa, is a profound impediment to the advancement of individuals and societies. Without proper intervention, undernutrition and the death and disease it causes are repeated with each generation.

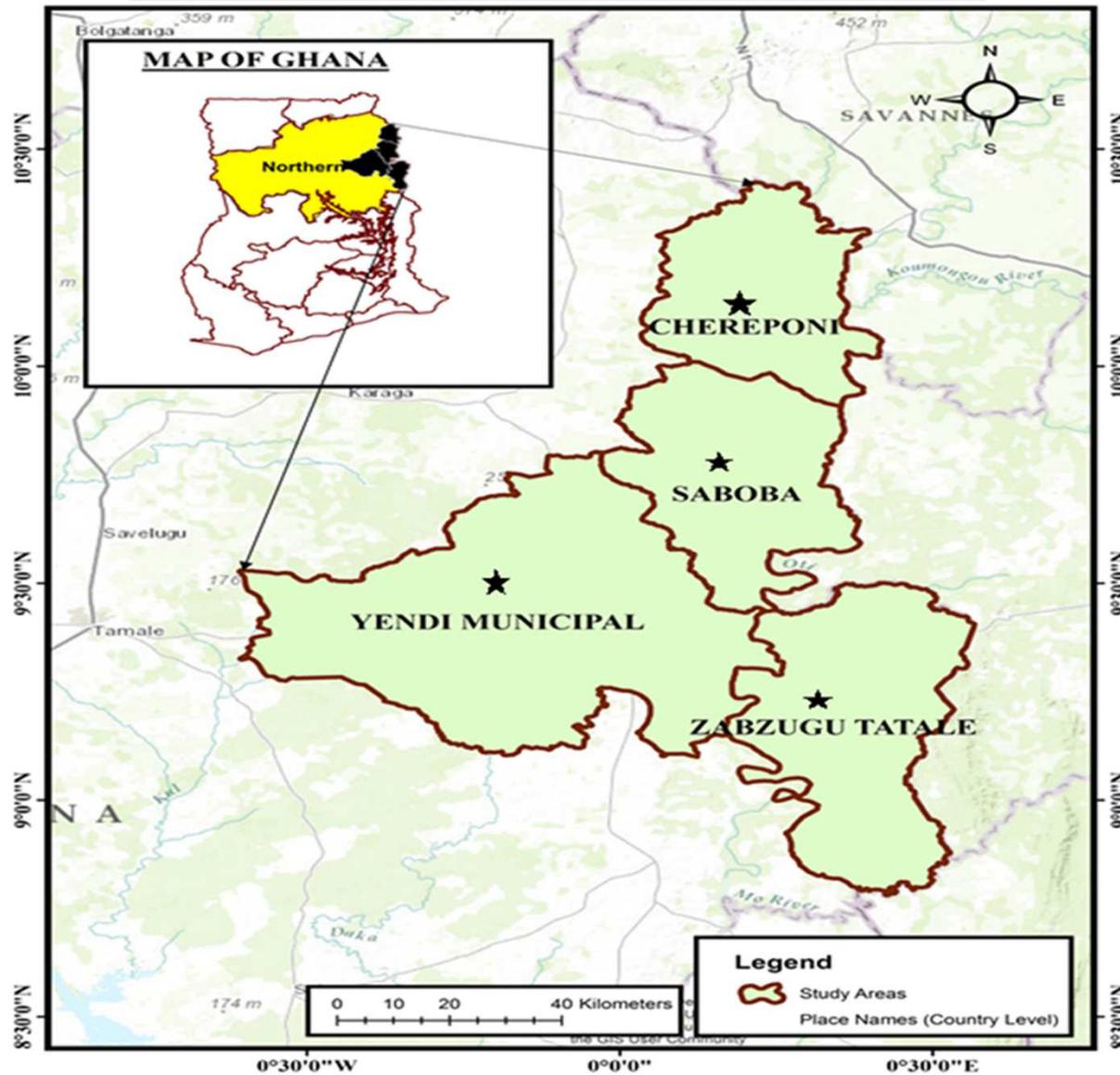
JUSTIFICATION

To overcome the challenges of malnutrition in Ghana, there is a need to explore indigenous crops of outstanding nutritional qualities. Although the nutritional composition of fonio, has long been established, this vital information has not been effectively communicated to the indigenes . This research seeks to educate farmers about the need to produce and consume more fonio as a dietary intervention towards reducing malnutrition by 50% in 2015.

OBJECTIVE

To analyse the food and nutrition situation in the enclave where fonio is produced in Ghana to highlight current knowledge and experiences with value added fonio products to improving nutritional status; to identify gaps; and to address the major issues and challenges that influence food systems in these Districts and the long-term development of the Region.

STUDY SITE



MATERIALS AND METHODS

□ Anthropometric Data:

- Height
- Weight
- Presence or absence of edema
- MUAC

Demographic data to collection

- Age
- Sex

Household Dietary Diversity (HDD)

FONIO AS A DIETARY INTERVENTION



Cont..



Results and discussion

- Food availability in Chereponi Ditric

| Food group | Types | Availability in the year |
|-----------------|---|--------------------------|
| Cereals | Maize, rice, millet, sorghum, fonio | 9/12 |
| Root and tubers | Yam, potato, cassava | 12/12 |
| Legumes | Cow pea, bambara, soya, ground nut | 10/12 |
| Vegetables | Tomato, okra, onion green leave, pepper | 7/12 |
| Fruits | Mango, orange, tangerine | 3/12 |
| Meat/poultry | Beef, goat, pork , chicken, duck | 12/12 |
| Fish | Mudfish, tilapia | 8/12 |
| Dairy/egg | Cow milk, yoghurt, cheese, egg | 12/12 |
| Oil and fat | Palm oil, soya oil, peanut oil, shea butter | 12/12 |
| Spices | Ginger, garlic maggi cube | 10/12 |

Results and discussion...

Fonio consumption among households

| Fonio product | Period/month | Number of household |
|------------------|--------------|---------------------|
| Fonio porridge | 4 | 25 |
| Plain fonio | 6 | 52 |
| Fonio with beans | 3 | 23 |
| | | |
| TOTAL | 13 | 100 |

Results and discussion...

Mean daily macronutrient intake of households

| | Mean nutrient intake | | | |
|--------------------------------------|----------------------|-------|---------------|------|
| | Mean | SD | Range | %kcl |
| Energy (kcl) | 2054.0 | 715.5 | 527- 4152 | |
| Protein (g) | 57.7 | 24.4 | 12.6 – 136.0 | 11 |
| Animal protein (g) | 20.1 | 20.0 | 1 - 7.5 | 4.6 |
| Plant protein (g) | 38.7 | 21.2 | 9.3 - 107.4 | 8.8 |
| Total carbohydrate (g) | 315.2 | 111.6 | 105.6 – 604.7 | 57 |
| Total fat | 75.3 | 32.4 | 1.8 - 179 | 32 |
| Fonio consumption individual portion | | | | |
| Size of fonio (g) | 150.4 | 33.6 | 114 – 208 | |
| Energy intake from fonio (g) | 322.5 | 72.6 | 238.4 – 438.9 | |

Results and discussion...

Acceptability of fonio as a dietary intervention

| Perception about fonio | Number of household | percentage |
|---------------------------------------|---------------------|------------|
| Fonio is a good food | 78 | 78% |
| Fonio cures diabetes | 11 | 11% |
| Fonio is tasty | 62 | 62% |
| Fonio is not available all year round | 55 | 55% |
| I don't know how to prepare fonio | 26 | 26% |
| Fonio is tedious to process and cook | 73 | 73% |
| TOTAL | | |

FONIO AS A DIETARY INTERVENTION



Cont...



The manual husking process



The fonio husking machine



CONCLUSIONS

- The result obtained so far suggest a strong correlation between the intake of fonio products and improved health condition of women and children.
- Attempts has been made to involve the local Health post and the Senior High School (SHS) in the final phase of the research.

POLICY RECOMMENDATIONS

- ❑ Government of Ghana should adopt research in NUS in order to avoid the over dependence on the traditional crops as a mean of livelihood and trade.
- ❑ The government should lend support to farmers as well as researchers in fonio in the form of inputs simple machinery and logistics to place Ghana in the league of fonio producing nations in the sub-region.



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THANK YOU ALL

