

IDENTIFICATION OF RESEARCH NEEDS IN SORGHUM AND MILLETS

1. SETTING WORKING GROUPS AND MANDATE

The Workshop attendees formed three working groups through voluntary association: Producer, Processor and Consumer/Products (Table).

The mandate of the working groups was to: Determine Research Needs in Sorghum and Millets in Africa arising from the Previous EU Supported Research Projects described at the Workshop and the State of the Art in Sorghum and Millet Research.

The Working Groups were asked to report under three headings: Needs, Opportunities and Beneficiaries.

Table Working group members

Producer Group Leader: Dr M Chisi	Processor Group Leader: Dr LF Hugo	Consumer/Product – Group Leader: Mr MM Kebakile
MM O’Kennedy	MSA Khan	YB Byaruhanga
LI Ezeogu	C Erasmus	A Minnaar
I Delgadillo	S Yetneberk	DD Rohrbach
IDK Atokple	NR Dlamini	S Buchner
JRN Taylor	EN Fombang	KG Duodu
AB Obilana	M Stading	NM Emmambux
PR Shewry	C Gao	J Taylor
	SM Wambugu	HS Laswai
	S Iannace	LW Rooney

2. REPORT-BACKS BY WORKING GROUPS

2.1 Producer Group

Needs

- 1) Consistent supply in terms of quantity and quality of sorghum and millets for various end uses = Enhance production and productivity through improved yields per unit area, management of input resources, including soil, water and biodiversity
- 2) Strategies to enhance and expand demand = Promoting commercialization of markets
- 3) Ensure food and health security

Opportunities

- 1) and 2) Understand what determines sorghum grain texture, and hence resistance to moulding, insect (head bug) attack, processing quality and nutritional quality
- 3) Nutritional enhancement as a cash crop and a subsistence crop: lysine, tryptophan, methionine, beta-carotene, antioxidants
- 3) Understand the physico-chemical characteristics and possibilities for transformation and processing of Finger Millet

Beneficiaries

Small scale farmers, Traders, Entrepreneur small-scale processors, Households, Scientific community in Africa, Science Training in Africa, and Regional Networks in Africa, and Networks between Africa and Internationally.

2.2 PROCESSOR WORKING GROUP

<i>Technology</i>	<i>Needs</i>	<i>Beneficiaries</i>	<i>Opportunities</i>
Milling	<ul style="list-style-type: none"> • Finding most appropriate manufacturing technologies for decortication/degerming, meals and flour production 	<ul style="list-style-type: none"> • Food processors 	
	<ul style="list-style-type: none"> • Promoting use of destoner (and quick screening test for grain quality assessment, grading equipment) to facilitate trading – education more important than technology transfer 	<ul style="list-style-type: none"> • Traders, food processors and farmers 	
Malting	<ul style="list-style-type: none"> • Improving malt final quality <ul style="list-style-type: none"> Effect of alkaline steeping on fungal contamination and product quality Possibilities of use of bio-control of fungal growth during malting Malting c increase β-amylase, protein quality and protein digestibility 	<ul style="list-style-type: none"> • Food processors, consumers 	Composite flours, brewing and bio-fortification
	<ul style="list-style-type: none"> • Development of simple and practical screening methods aimed at quick identification and determination of types and levels of fungal contamination of grains and malts. 	<ul style="list-style-type: none"> • Traders, food processors and farmers 	

<i>Technology</i>	<i>Needs</i>	<i>Beneficiaries</i>	<i>Opportunities</i>
Reduction of anti-nutritional factors off flavors	Investigate processing methodologies to eliminate anti-nutritional factors and mousy odour in millet intended for value added products	Consumers, Farmers and processors	Increase marketability, health products
Extrusion	<ul style="list-style-type: none"> •Investigate alternative heat treatment technologies •Extrusion at a reasonably acceptable price <ul style="list-style-type: none"> ➤ multiple use ➤ reasonable running costs ➤ consistent supply of spare parts 	Consumers, Farmers and processors	Growing demand for weaning foods, snack foods, convenience foods
Composite flours	<ul style="list-style-type: none"> •Break through needed •Search for potential market for gluten free foods (e.g. in Europe) •Fortification: blended with legumes for enhanced nutritional food quality 	Consumers, Farmers and processors	Increase marketability, health products
Non-food use (sorghum and by-products)	<ul style="list-style-type: none"> •Other polymers, i.e. speciality polymers with unique functional properties (e.g. medical use) •Use of solar drying to cut extraction costs 	Production industries and consumers	New demands by food, pharmaceutical & alternative plastics industries

<i>Technology</i>	<i>Needs</i>	<i>Beneficiaries</i>	<i>Opportunities</i>
Industrialization /Consumer Research	<ul style="list-style-type: none"> •Identification of traditional foods most consumed in urban areas (<i>factors for preference</i>) •Shelf-life studies on identified traditional/ indigenous foods – including packaging, •Identification of new products for consumer needs for: <ul style="list-style-type: none"> ➢ Convenience ➢ Health enhancement, etc 	Consumers, Farmers and processors	Increase marketability , health products
Nutrition	<ul style="list-style-type: none"> •Nutritional profiling on identified and new developed foods Information on the effect of processing on the nutrInvestigate alternative heat treatment technologies •Promoting the use of destoner (cleaning, grading),and decortication equipment •Adoption of extrusion technology at an acceptable cost •Development of solar drying technology 	Consumers, processors, traders	Novel foods, healthy foods, weaning foods
Equipment and Technology transfer	<ul style="list-style-type: none"> Extrusion at a reasonably acceptable price <ul style="list-style-type: none"> ■multiple use ■reasonable running costs ■consistent supply of spare parts 	Processors, traders	Better quality products, new markets
Access and dissemination of information (creation of database)	<p>Integrated database on sorghum and millet (ICRISAT, CSIR, NRIs, EU)</p> <p>To include,</p> <ul style="list-style-type: none"> ➢Fungi problem at local and regional level ➢Characterization of sorghum and millet cultivars, products in terms of processing properties <p>• Handbooks on processing, quality control and hazards.</p>	Food processors, farmers and consumers	

2.3 CONSUMER/PRODUCTS WORKING GROUP

Main idea:

- To provide diversified or flexible convenient sorghum/millet products targeted to specific consumer groups

PRIORITY 1: Nutrient dense foods

PRIORITY 2: Traditional, convenient foods for urban consumers

Research challenges

- Affordable (develop simple food technologies)
- Convenient
- Nutrients must be bioavailable and meet the specific dietary requirements
- Shelf stable foods
- Culturally acceptable
- Taste good
- Marketing

FOOD SCIENCE AND TECHNOLOGY RESEARCH ISSUES

- Mechanisms for improving protein quality of processed foods
- Mechanisms for improving sensory quality and acceptability of processed foods (e.g. mousy flavour of pearl millet)
- Mechanisms for improving grain quality (e.g. mold resistance)
- Mechanisms for exploiting antioxidant and antimicrobial activity of phenolic compounds in processed foods

MARKET RESEARCH ISSUES

- Diagnostic surveys of industry and consumer needs
- Reducing grain assembly and transport costs
- Reducing stockholding costs
- Improved grain cleaning systems
- Efficient grain processing systems