Terms of Reference

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CONSULTANCY TERMS OF REFERENCE	COMPILATION (MONOGRAPHS) OF AFRICAN INDIGENOUS CEREALS, PULSES AND OILSEEDS AND THEIR VALUE ADDITION FOR COMMERCIALIZATION
CONSULTANT	
	P. O. Box
Tel:	
Email:	
Duration:	
	Total Pay: Financial Proposal

ARSO Central Secretariat
Nairobi, Kenya
September 2022

Compilation (monographs) of African indigenous cereals, pulses and oilseeds and their value addition for commercialization

1. Background

The word "indigenous" as an adjective often refers to the native, traditional or ancestral nature of an entity in a geographical location, which may or may not relate to indigenous peoples (FAO, 2021). The term 'indigenous foods' refers to plant- and animal-based foods (such as dairy) that are naturally existing and produced in specific locations and consumed as part of traditional diets (Rampa *et al.*, 2020). "Indigenous food systems (IFS)" refer to systems of cultivation, processing, storage, trade, and consumption, which are specific to particular geographic regions, and whose origins generally pre-date large-scale industrial agriculture (Keleman Saxena *et al.*, 2016). In this sense, "indigenous food systems" would include systems relying primarily on minor and/or endemic food crops (including native or underutilized species), or farmer-saved varieties of major food staples, such as corn, rice, and wheat. A traditional crop is an indigenous species native to a specific region or one that was introduced a long time ago and, due to long use, has naturalized and become part of the culture of a community (Maundu, 1997; Muthoni & Nyamongo, 2010). African indigenous vegetables are defined as 'all categories of plants whose leaves, fruits or roots are acceptable and used as vegetables by rural and urban communities through custom, habit and tradition' (Muhanji *et al.*, 2011). African leafy vegetables may be defined as species of plants that are either genuinely native to a particular region, or plant species that were introduced to that region so long ago so as to have evolved through natural processes or farmer selection (van Rensburg *et al.*, 2007). In this paper, the term indigenous and traditional food crops (ITFCs) shall carry the meaning of traditional food crops including cereals, pulses, oilseeds, nuts, fruits, vegetables, roots and tubers used by African indigenous communities.

Other terminologies used to describe indigenous and traditional crops include the following:

Neglected crops: *"Neglected crops are those grown primarily in their centres of origin by traditional farmers, where they are still important for the subsistence of local communities. Some species may be widely distributed around the world but tend to occupy special niches in the local ecology and in local production and consumption systems. While these crops continue to be maintained by sociocultural preferences and the ways they are used, they remain inadequately documented and neglected by formal research and conservation"* (IPGRI, 2002).

NUS: "*Acronym standing for Neglected and Underutilized Species and applied to useful plant species which are marginalized, if not entirely ignored, by researchers, breeders and policy makers; they belong to a large, biodiverse group of thousands of domesticated, semi-domesticated or wild species; they may be locally adapted minor crops as well as non-timber forest species. The 'NUS' term is a fluid one, as when a crop is simultaneously a well-established major crop in one country and a neglected minor crop in another. NUS tend to be managed with traditional systems, use informal seed sources and involve a strong gender element*". In a wider sense, the term NUS also could be used to refer to animal species. (Padulosi *et al.*, 2013).

Orphan crops: *"Orphan crops are defined as crops that have either originated in a geographic location or those that have become 'indigenized' over many years (> 10 decades) of cultivation as well as natural and farmer selection. The term 'orphan' has often been used to refer to crops that*

may have originated elsewhere, but have undergone extensive domestication locally, thus giving rise to local variations, i.e., 'naturalized/indigenized crops'". (Mabhaudhi *et al.*, 2019)

Underutilized crops: *"Underutilized crops were once grown more widely or intensively but are falling into disuse for a variety of agronomic, genetic, economic and cultural reasons. Farmers and consumers are using these crops less because they are in some way not competitive with other species in the same agricultural environment. The decline of these crops may erode the genetic base and prevent distinctive and valuable traits being used in crop adaptation and improvement".* (IPGRI, 2002).

Indigenous and traditional foods crops (ITFCs) have multiple uses within society, and most notably have an important role to play in the attempt to diversify the food in order to enhance food and nutrition security (Akinola *et al.*, 2020). However, research suggests that the benefits and value of indigenous foods within the African context have not been fully understood and synthesized. Their potential value to the African food system could be enhanced if their benefits were explored more comprehensively.

Indigenous foods, knowledge and technologies can contribute to the 'People' dimension of the SDG 2030 Agenda in two important ways: firstly, by providing access to healthy and nutritious foods that are affordable for the poor, and secondly, by empowering the growers, producers and processors of these foods. Because indigenous foods are often grown and sold by women (and sometimes youth), developing this sector may empower them in terms of offering a more regular or stable income, or increasing women's freedom to make economic choices, e.g. to invest (Balderman *et al.* 2016, Chivenge *et al.* 2015). A related social dimension is that the traditional knowledge attached to indigenous foods, can lead not only to acknowledgement of and respect for people's cultural identity, but can also contribute to new or better uses or improved processing technologies of the indigenous products themselves.

2. Strategic significance of indigenous African cereals, pulses and oilseeds

Staple crops face major challenges in the near future and a diversification away from over-reliance on staples will be important as part of the progress towards the goal of achieving security of food production. Underutilized or neglected crops species are often indigenous ancient crop species which are still used at some level within the local, national or even international communities, but have the potential to contribute further to the mix of food sources than they currently do. Neglected or underutilized crops have the potential to play a number of roles in the improvement of food security that include being: (i) part of a focused effort to help the poor for subsistence and income, the majority of whom live in the rural areas; (ii) a way to reduce the risk of over-reliance on very limited numbers of major crops; (iii) a way to increase sustainability of agriculture through a reduction in inputs, such as fossil fuel-derived nitrogen fertilizers and fuel for agriculture, given the risks of the carbon footprint of agriculture on climate change and the transition to a post peak-oil world; (iv) a contribution to food quality; and (v) a way to preserve and celebrate cultural and dietary diversity (Mayes *et al.*, 2012).

Key features of indigenous food crops include (Padulosi *et al.*, 2022):

(a) *Relevant to local consumption and production systems:* being intimately linked to local food cultures, NUS are used in traditional food preparations and are associated with social and religious ceremonies and rituals.

(b) *Adapted to agroecological niches and marginal areas:* NUS often demonstrate comparative advantages over commercial crops due to natural selection or selection carried out by local growers against biotic and abiotic stresses, which makes them perform comparatively better under low input and biological agriculture techniques.

(c) *Resilient to climate change:* compared with commodity crops, NUS are highly adapted to biotic and abiotic stresses related to climate change, something that is being increasingly confirmed by scientific research.

(d) *Rich in traditional knowledge:* in view of the ongoing cultural erosion affecting traditional societies, associated knowledge on NUS is being rapidly lost, which, in turn, leads to the loss of genetic diversity and continued opportunities for appreciation by consumers, especially the younger generation.

(e) *Highly relevant in Indigenous Peoples' societies*: for Indigenous communities, NUS are the result of sophisticated trials and accumulation of experience over many centuries and generations: they are a manifestation of a systematic process that involved intricate ways of learning and accumulating experience.

(f) *Multi-functionality and multiple benefits:* they are often able to provide people with not just nutritious food, but also valuable non-food products and ecosystem services. Excellent examples of such multi -functionality can be found in Bambara groundnut, chaya or minor millets.

Adding value to orphan crops can lead to better livelihoods and improved income generation, especially for smallholder farmers (Sogbohossou *et al.*, 2018). Such species may also contribute to enhanced climate change mitigation via increased hardiness, reduced external inputs, and subsequent reduction of the carbon footprint of agriculture. Despite this potential, orphan crops improvement has largely been absent from the global agricultural research agenda, presumably because the relevance of any given orphan crop species is highly geographically and culturally specific. Several challenges impede the utilization and conservation strategies of orphan crops, including low productivity, limited variety development, lack of consumer awareness, absence of a value chain, and loss of knowledge.

Oil crops are considered the second most important determining factor of agricultural economy after the major cereal crops, the world over (Gosal & Wani, 2022). There are about 40 different oil seeds whose oil can be consumed but only a few are significant in the total world trade (Sharma *et al.*, 2011). Oilseed crops are very diverse in the plant kingdom and belong to several families, and oils are extracted mainly from their seeds, germs, and/or fruits (Gosal & Wani, 2022). About 13 each of herbaceous and woody crops are reported to be important sources of oil (Zhou *et al.*, 2020), but 10 herbaceous and 2 woody (coconut, oil palm) sources are considered important on the basis of their global production and use. Edible plant oils (EPOs) are extracted mainly from 11 plant sources: 2 are of tree origin, namely, oil palm and coconut; 9 are from annuals like soybean, groundnut, rapeseed-mustard, sunflower, safflower, sesame, cotton seed, and maize and rice (bran); and 2 crops, castor and linseed, are exclusively used for industrial purposes.

Vegetable oils are oils or fats extracted from a plant. Their texture can be described as liquid, oily and fatty. Most vegetable oils are able to fulfill two functions: they can either be used as cooking oil or for fuel and diesel production. The most common oil types include palm oil, soybean oil, canola oil and sunflowerseed oil. Palm oil is extracted from the flesh of the palm fruit, which is primarily found in the tropical climate of Africa, South America and South East Asia. It is estimated that about 90 percent of palm oil is used for food consumption, whereas industrial consumption such as cosmetic products or fuel and diesel claim the remaining 10 percent.

Common beans and other pulses are diverse food sources of high nutritional value (protein, energy, fibre, and vitamins and minerals) with broad social acceptance (Siddiq & Uebersax, 2022). These legume crops demonstrate global adaptability, genotypic and phenotypic diversity, and multiple means of preparation and dietary use. Beans and pulses are produced in regions as diverse as Latin America, Africa, Asia, and North America. Traditionally, these food crops have not been afforded their due importance to a scale similar to some other crops such as soybean and staple crops, such as wheat, corn, and rice. However, in recent years, pulse crops have gained increased importance due to their value as plant-based proteins and meat alternatives. Moreover, pulse flours and ingredients are finding new uses in diverse food applications with enhanced nutritional and sensory properties. Numerous factors influence utilization of grain legumes, including type and cultivar selection, cropping environment and systems, storage conditions and handling infrastructure, processing methods, and final product preparation. Further, nutrient content and bio-availability are dramatically influenced by these diverse factors. In recent years, beans and pulses have been cited for imparting specific positive health potentiating responses, such as hypocholesteremic response, mitigation of diabetes and colorectal cancer, and weight control. Enhanced dry bean utilization focused on improved dietary health is an opportunity within both subsistent and developed populations.

3. Problem Statement

While over 5000 plant species are recorded as food plants, <20 species provide most of the world's food; and three cereals—rice, wheat, and maize—account for ~60% of the calories and ~56% of the protein that humans consume directly from plants (Cullis *et al.*, 2019; Jacobsen *et al.*, 2015; Lenné & Wood, 2011; Sogbohossou *et al.*, 2018; Willis & Bachman, 2016). The bulk of edible species in the world are therefore non-commodity crops that are mostly overlooked by research and development initiatives. Thus, they are often referred to as orphan, minor, neglected, underutilized, and/or unimproved crops. Orphan crops are also often indigenous, native species or those introduced centuries ago that are still used locally or even regionally, with much untapped potential to increase nutritional security. Such species contribute to regional diets, are often adapted to local environmental stresses, and may already be integrated into existing production systems, yet there is little investment to improve their productivity or quality.

The availability of food in the developing world has gradually declined due to the rapid growth of the human population, various environmental factors, lack of improvement of local crop species, erosion of high genetic diversity and dependency on a few crop species for food supply (Ochatt & Jain, 2007). Only 30 plant species are used to meet 95 % of the world's food requirements. These crops are widely and intensively cultivated and selected from a large agro-biodiversity pool, and yet the exploitation of our plant genetic diversity is far below that which would allow high potential of exploitation in crop improvement. Several factors such as physical appearance, economic gains and others are responsible for the promotion and acceptance of 'major crops' worldwide.

Food and nutrition security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life (FAO *et al.*, 2012). The prevalence of undernourishment in Africa currently stands at 23.8% with most countries being characterised as food and nutrition insecure (FAO, 2014). In a region where 70% of the population relies on agriculture, it follows that agriculture remains the main vehicle for addressing food and nutrition security. The approach taken during the last decades was to promote the cultivation of a few high yielding high input crops. While this has helped to

reduce levels of food insecurity, it paid lip service to nutritional security due to focus on a few starchy crops. The need for nutritional security cannot be understated; it is the foundation upon which human well–being is built (IFPRI, 2014). A key strategy is tapping into Africa's agro-biodiversity and broadening the food basket to meet the nutritional requirements of people in the region. Traditional crop species which are often neglected and underutilised, rely on biological functioning of the ecosystem, require low input of synthetic fertilisers, pesticides and irrigation could be promoted as an alternative for ensuring food and nutritional security (Modi & Mabhaudhi, 2013; van Rensburg *et al.*, 2007). Diversity of diets based on diverse crops delivers better nutrition and greater health with additional benefits for human productivity and livelihoods.

Developing countries need to explore undervalued indigenous plants to fully enhance their food and nutrition security, health, and economic viability (Omotayo & Aremu, 2021). Why have our food systems come to rely on such a narrow range of plant species of limited nutritional value? Today three staple crops (rice, maize and wheat) account for more than 50% of calories consumed while we continue to disregard the huge diversity of nutrient-rich plant species utilized by humanity throughout our history (Hunter *et al.*, 2019).

Africa faces serious challenges in feeding its population, having reverted from being a net exporter of agricultural commodities to being a net importer of the same for the last three decades (Khan *et al.*, 2014). Indeed, Food and Agriculture Organization (FAO) statistics reveal that the amount imported is increasing at an almost exponential level. The continent also has the highest population growth rates in the world. Human population more than tripled in the second half of the twentieth century, from 230 million to 811 million. In spite of this rapid surge in human population, average growth in food production in the continent has at best stagnated, with reports indicating decline in crop yields over the last few decades in several places within the continent. Indeed, Africa has the tragic distinction of being the only continent where food production has been declining in the past few decades.

A review of literature from the Food and Agriculture Organization of the United Nations (FAO) indicates that Africa and Latin America were net exporters of agricultural and food commodities in the 1940s till early 1950s while Europe and Asia had food production deficits and hence were net importers. In particular FAO (1947) noted that both Africa and Latin America were sparsely populated, with great undeveloped or partially developed land resources, enabling them to potentially produce food far in excess of their own needs. After the Second World War (WWII), countries in the Far East gained independence and the new leaders *expressed impatience* with poor living standards and embarked on improving them (FAO, 1948). Increasing urbanization in Africa and South America and the increasing purchasing power of city populations meant that South America and Africa were reducing their food exports, hence the quest by Asian countries to increase food production.

FAO (1948) explains that the public became food and nutrition conscious during the WWII, realizing for the first time that enough food of the right kinds could effect a major improvement in health and that food production and distribution should be organized to this end, leading to among other things, the establishment of FAO. It appears that prior to 1900, food was only quantitatively considered as fuel, and its value expressed in calories. Qualitative factors such as proteins, different types of vitamins and minerals began to be understood from 1900 onwards. Only gradually was it understood that a relatively small scarcity of each of these factors decreases the evolution, growth, and health of the body and its resistance against stress (physical or psychological) and against infection. Finally it was realized that malnutrition, even in a degree far from actual hunger, tends to make people inefficient and irrational in their activities, and that the converse is also true: a people

cannot be a healthy and benevolent people without adequate amounts of the right kinds of food (FAO, 1948).

Throughout the early 1950s to the 1960s, Africa's food production registered a decline in the face of a rapidly growing population. By 1960, African food production seems to have remained at the same levels as those just after WWII and even indicated signs of decline (FAO, 1960). FAO (1978) reports the disquieting situation of Africa's food production having completely failed to match population growth with an equally disquieting deteriorating nutritional condition. The vicious poverty-inducing nature of this situation is captured in the FAO report which states that "In many developing countries, rising food import requirements, especially of cereals, have progressively reduced their ability to import capital goods, fertilizers and other production requisites" (FAO, 1978).

The advent of colonialism and settlement of foreign settler farmers marked the introduction of new crops (Hippert, 2018). Colonial-era agriculture was organized around export-oriented, cash-crop production, ushering in centuries of plantation economies to export commodity products such as sugar, coffee, cocoa, tea, and cotton. In fact, very few of the cash crops the colonies produced were native to these regions, and one effect of the colonial era was an increase of the globalization of foods. The period of intense agricultural growth from the early 1960s to mid-1980s, known as the Green Revolution, was characterized by an unprecedented expansion in the production of staple crops through the development of high-yielding varieties (HYV) (Padulosi *et al.*, 2022; Turner & Turner, 2007). The Green Revolution contributed to a reduction of poverty. An increase of approximately 15% in per capita GDP as a result of a 10% use increase of the HYV in the period 1960–2000 was observed, with an associated reduction of food insecurity for billions of people, and an estimated 18–27 million hectares of natural ecosystems safeguarded from being converted to agricultural land. Increasingly there has been a widespread adoption in many indigenous and local communities of food produced using a largescale industrial mode, much of it from distant parts of the globe and often of lower nutritional quality than traditionally locally produced food. Unfortunately, this success came with a heavy cost to the environment (e.g., in the loss of wild and cultivated biodiversity, water scarcity, increased crop vulnerability to pests and diseases and loss of soil fertility), and caused a deterioration in human nutrition (e.g., with essential amino acid deficiencies and a general lack of balanced essential fatty acids, vitamins and minerals from cereal-dominated diets), as well as increased health hazards from the widespread use of pesticides. The rising incidence of health problems, such as late onset diabetes, heart disease, and other dietary and lifestyle illnesses as well as the compounded challenge to food sovereignty, which the growing hegemony of the global food system represents, has provided a new focus for African indigenous food crops.

4. Objectives for the Study on Indigenous Cereals, Pulses and Oilseeds

(1) Identify and document indigenous African:
   (a) Cereals
   (b) Beans and pulses
   (c) Oilseeds

(2) Develop an inventory of the indigenous crops including their distribution range, parts used and products commonly derived from the plant in a tabular format as shown in Table 1.

Table 1: Inventory of African indigenous cereals, beans, pulses and oilseeds

No	Taxon	Common crop name	Distribution	Used plant parts	Uses and products
1	*Eleusine africana* Kenn. -O'Byrne	Wild African Finger Millet	Angola, Botswana, Burkina, Burundi, Cameroon, Chad, Comoros, DR Congo, Egypt, Eritrea, Ethiopia, Gambia, Ghana, Guinea-Bissau, Kenya, Lesotho, Madagascar, Malawi, Mali, Mozambique, Namibia, Niger, Nigeria, Oman, Rwanda, Saudi Arabia, Senegal, Sierra Leone, Sinai, Socotra, Somalia, South Africa, Sudan, Swaziland, Tanzania, Togo, Uganda, Yemen, Zambia, Zimbabwe	Grains; Straw	Ground into a flour and cooked into cakes, puddings or porridge, ugali (stiff porridge); fermented into a fermented beer. The straw is used as animal fodder; to make baskets, thatching; bowls.
2	*Eragrostis tef* (Zucc.) Trotter	Teff	Eritrea, Ethiopia	Grains, straw	Injera (a sourdough-risen flatbread), alcoholic drinks, baby foods, animal feeds; thatching, walling

(3) Please provide clear illustrations of the crops through your own original photographs or copied photographs from other sources which are bibliographically referenced in respect of copyright regulations.

Figure 1: Field of young finger millet (Yemets *et al.*, 2020)

Figure 2: Finger millet: Impact of Plant Spacing and Mature Crop of Finger millet (Gebreyohannes *et al.*, 2021; Yemets *et al.*, 2020)

Figure 3: Finger millet grains

(4) Through comparative analysis, elaborate those indigenous crops which can substitute or replace exotic crops in the same categories. Such comparative analysis shall focus on key proximate analyses such as those presented in Table 2 below.

Table 2: Comparison of the nutrient composition of marama bean (per 100 g dry matter) with that of soybean and groundnut (Omotayo & Aremu, 2021)

Class	Nutrient	Marama bean[23]	Soybean[24]	Groundnut[24]
Proximate	Ash (%)	3.19	4.50	3.80
	Dry matter (%)	96.22	92	95
	Fat (%)	40.06	25	50
	Moisture (%)	2.67	7	9
	Non-structured carbohydrates (g)	11.85	15	20
	Protein (%)	34.71	45	25

(5) What are their environmental production requirements?

Well referenced highlight on the environmental conditions in which the crops perform well. Please indicate adaptations to biotic and abiotic stress conditions of the crops.

(6) What is the geographical distribution of the crop?

A map showing the geographical distribution of the crop from an authoritative source shall be inserted as follows:

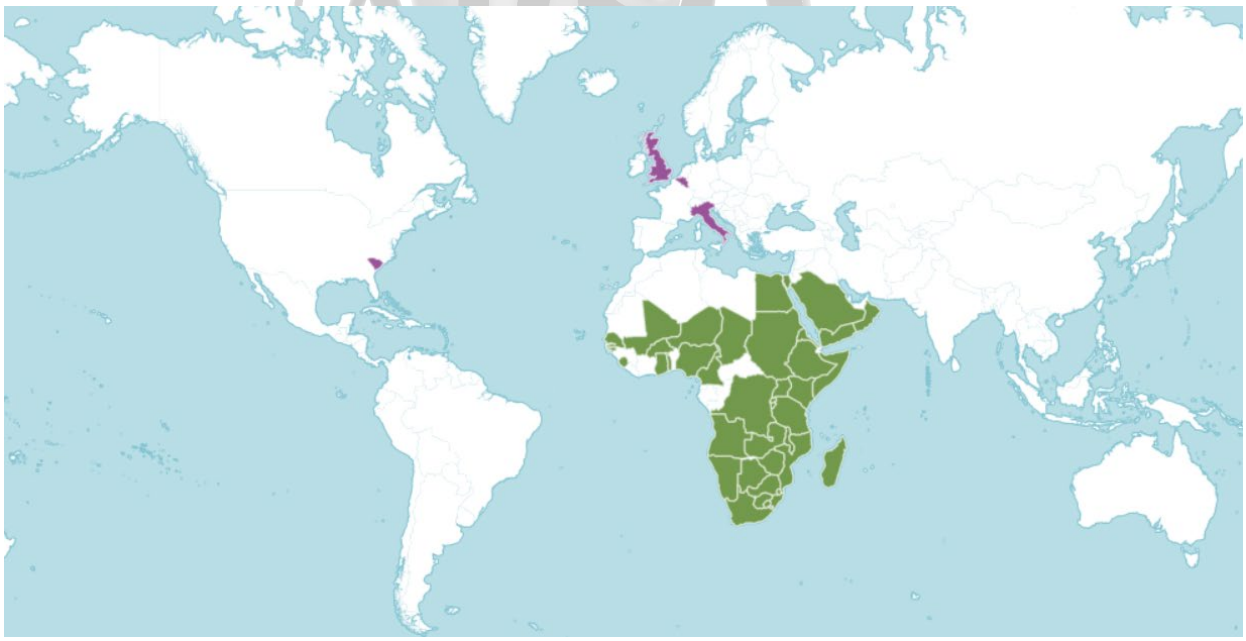

Figure 4: Distribution of *Eleusine africana* Kenn. -O'Byrne (Wild African Finger Millet) (GBIF, 1957; Kew Science, 1957)

(7) What are the guidelines for their primary production? What are the agronomic practices pertaining to optimal performance of the crops?

This includes, but is not limited to the various impacts of different fertilization schemes (organic or chemical fertilizers, doses and frequencies of applications), soil tillage regimes

(tillage vs. no tillage), irrigation practices (doses and frequencies of water supply, waterlogging), planting densities, crop pests and diseases, crop protection strategies and products, and harvesting modes (e.g., rooting, cutting, leaf picking) on growth, regrowth (when applicable), and overall yield are important factors to take into account throughout the breeding process. What are the common crop diseases and crop protection methods and products?

The agronomic practices may be accompanied by illustrations to promote better understanding.

(8) What are the value added products, their procedures, hygiene, quality and marketing requirements?

This section shall demonstrate the procedures for value added products obtained or potentially obtainable from the various indigenous African crops. Bearing in mind that the products might be localized and traditionally processed, the consultant shall explore the areas of improvement to achieve hygiene, quality, safety and market compliance of the value-added products.

It is recommended that the consultant combines process charts for product development as aids to understand the process and product pictorials as a means of enhancing comprehension.

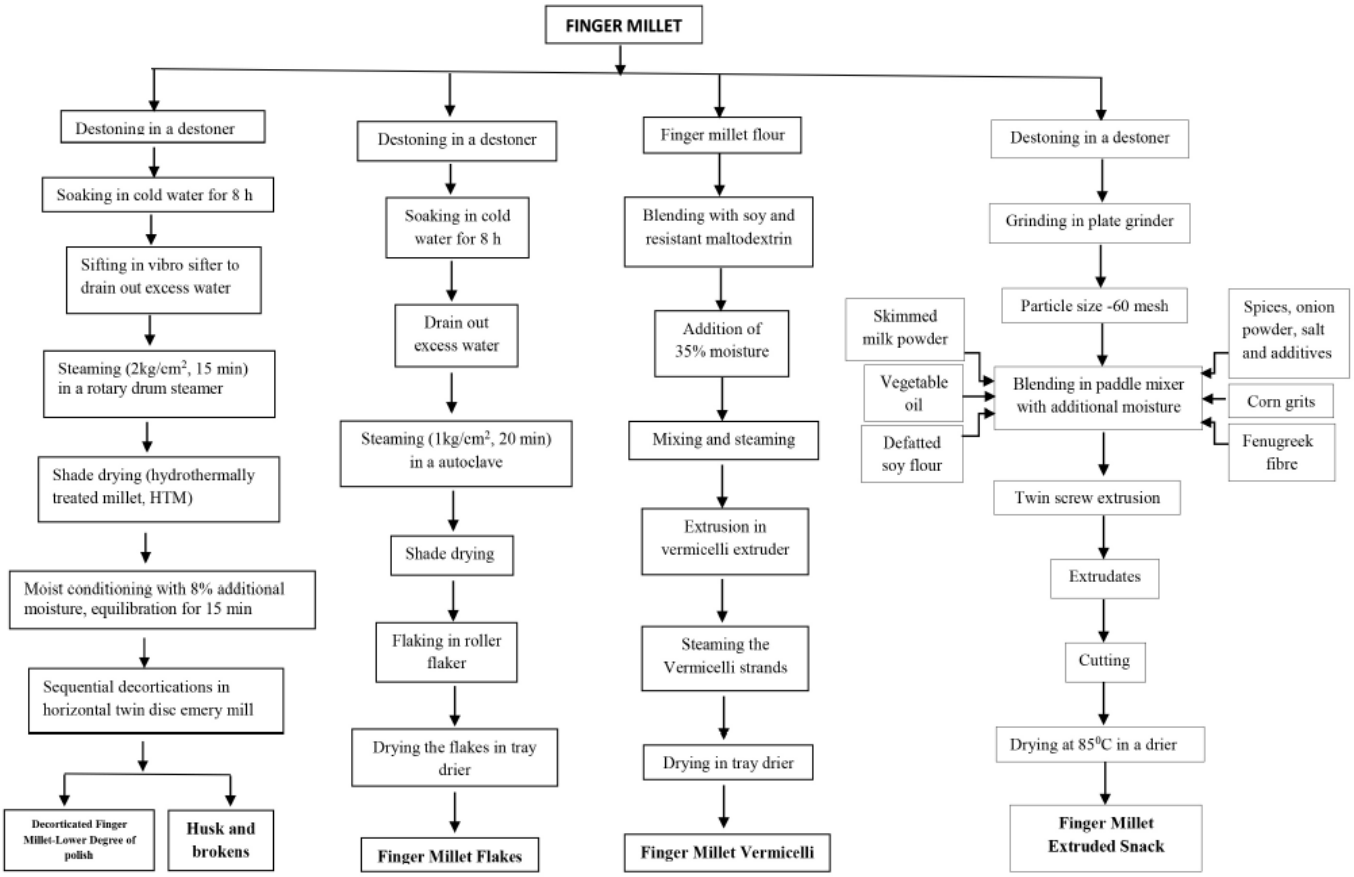

Figure 5: Flow chart for the preparation of finger millet-based products (Shanmugam *et al.*, 2018)

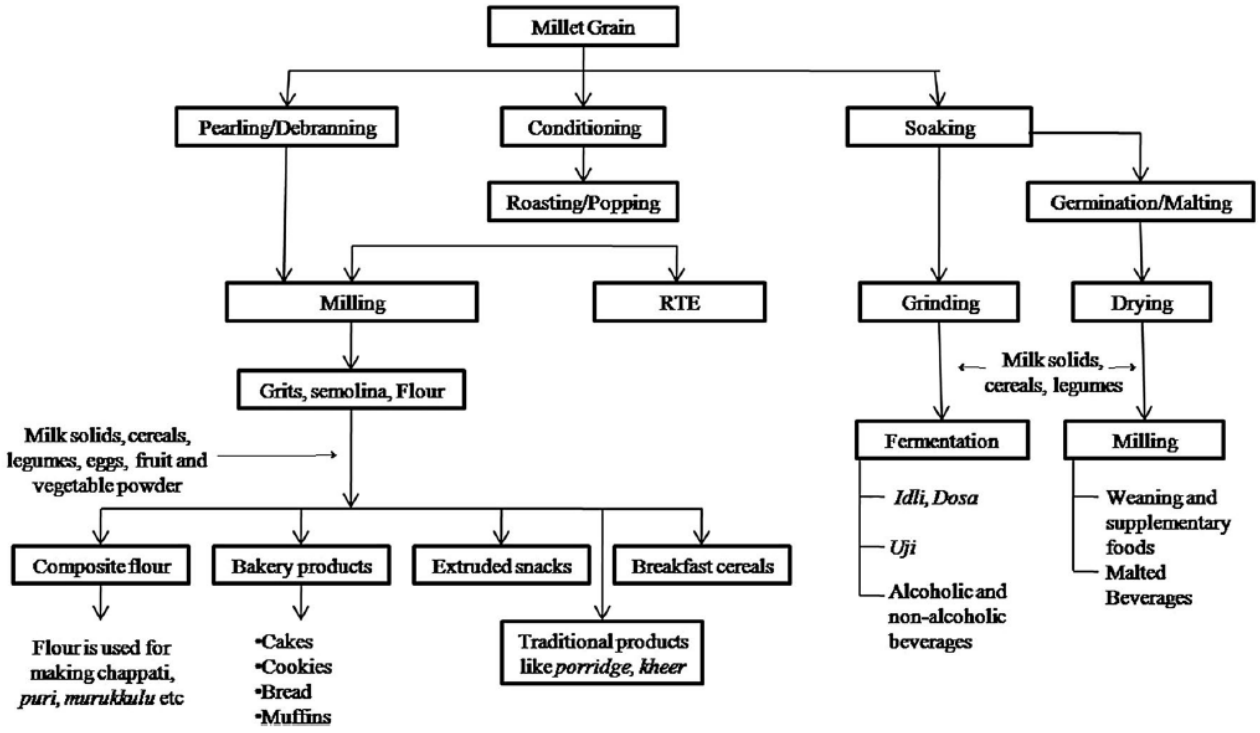

Figure 6: Schematic diagram for developing millet-based composite foods (Kumar *et al.*, 2018)

(9) What is the potential for standardization and conformity assessment of the primary and value-added products?

From a selection of the most significant value-added products, the consultant shall establish the criteria for the products to have standards and conformity assessment procedures established to facilitate certification and trade facilitation. If the value-added products are composites, this shall be illustrated clearly.

5. Nature of the Compilation

The consultant shall prepare the compilation in the form of a compendium of monographs with sufficient details and illustrations of high clarity/resolution.

6. Value Addition Procedures

Value addition procedures shall be the core deliverables of the consultancy. The guidance provided in the preceding sections shall be utilized in addition to the best industry practices obtained from authoritative referenced sources. The value addition shall lead to standardization and certification of the products for placing in the market.

7. Implementation Methodology and Assignment Duration

In undertaking the tasks described above, the consultants will employ a combination of desk research, review of research articles and publications and telephone or web interviews with relevant stakeholders.

The consultancy shall be for a period of 6 months and the key deliverables are outlined below:

- Output 1: Inception report outlining the understanding of the task, issues to be addressed, methodology and sources of information; an annotated outline of the study (within 3 weeks after signing the contract)
- Output 2: Draft Compilation (by the end of month 3)
- Output 3: Final Compilation incorporating feedback from the validation workshop (by the end of month 6)
- Output 4: PowerPoint Presentation

8. Consultant Qualifications

- At least a Master's degree or equivalent in Agriculture, Biological Sciences, Food Sciences, or related areas.
- Track record of research and publication in the area of scope of this assignment.
- Minimum of 5 years of professional experience working in Agriculture, Biological Sciences, Food Sciences, or related areas.
- Proven working experience on standardization and /or value addition will confer distinct advantage.
- Demonstrated involvement in policy formulation in the agricultural value chains, as well as experience working with governments of the AU Member States and other relevant stakeholders is an asset.
- For this specific job opening fluency in English and/or French is required. Knowledge of the other is an asset.

9. Application process

Interested and qualified consultants should submit their applications for indigenous African cereals, pulses and oilseeds, the application should include the following:

1. A CV and demonstration of accomplishment of similar assignments
2. A technical proposal for implementing the assignment highlighting the consultant understanding of the scope of the work, methodology of Exclusivity and Availability for the duration of the assignment.
3. An outline of the indigenous African cereals, pulses, and oilseeds.
4. Financial proposal for completing the assignment highlighting the cost and its breakdowns.

10. Payment Schedules

The total payment shall be paid in two instalments as follows:
40% upon delivery of Draft Compilation (by the end of month 3).
60% upon delivering the Final Compilation and PowerPoint Presentations at the end of six months.

Formal application shall be done latest by **18th November 2022 before 5:00 p.m.**

Applications should be addressed to:

Secretary General
African Organisation for Standardisation (ARSO) Central Secretariat
International House 3rd Floor
P.O. Box 57363-00200 Nairobi-Kenya
Tel. +254-20-2224561, +254-20-311608

Preferably by e-mail to: info@arso-oran.org, arso@arso-oran.org and arsopit@arso-oran.org

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