

## Indigenous knowledge and traditional conservation of fonio millet (*Digitaria exilis*, *Digitaria iburua*) in Togo

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**Abstract.** Fonio millet (*Digitaria exilis* Stapf, *Digitaria iburua* Stapf) is known in Togo for several centuries and has played a strategic role in the household food security mainly in rural areas. Using Participatory Research Appraisal (PRA) tools and techniques, 55 villages randomly selected in the two production zones of Togo were surveyed to document the ethnobotanical and indigenous knowledge related to its production, diversity, use and conservation. For all of the ethnic groups involved in fonio production in Togo (Akposso and Akébou in the south; Losso-Nawda, Lamba, Tamberma, Tchokossi and Gangan in the north), the crop has a high sociocultural value. The fonio genetic diversity being managed by the farmers seems important as 42 landraces were recorded. Two lines of origin that contributed to this current genetic diversity (local domestication or introduction from neighbouring countries) were reported by the farmers. Cooking qualities, growth cycle, colour and size of the grains are the main criteria used by farmers to describe varieties. According to farmers, fonio production and diversity are being regressing because of several constraints of which the most important are lack of adequate harvest, threshing and processing technologies and development of pests and diseases. The important ethnobotanical and indigenous data recorded will be useful in accessing the genetic diversity of the crop in Togo and in defining appropriate strategies for its conservation on farm.

### Introduction

The cosmopolitan genus *Digitaria* (Gramineae, Poaceae) includes 230 species that are widely distributed in the tropics and in the subtropics (Clayton and Renvoze 1986). Among them, *Digitaria exilis* and *D. iburua*, known respectively as white and black fonio, are domesticated and cultivated in West Africa (Portères 1976) where they are staple food for several millions of people.

According to Bezpaly (1984) and Vietmeyer et al. (1996), the total area cultivated by year is estimated at about 300,000 ha. Fonio is one of the most nutritious and best-tasting of African cereals (Jideani 1990). Its seeds are rich in methionine and cystine, two vital amino acids in human nutrition that are lacking in some major cereals such as rice, wheat, sorghum, barley and rye (Vietmeyer et al. 1996). The crop withstands drought and floods and flourishes in poor soils. Therefore, it has a potential of playing future role in agriculture and food security in West-Africa. However, this potential cannot be exploited to advantage if the basic information related to the production, use and diversity are not well understood.

In Togo, a long history of cultivation and tradition coupled with high landraces diversity (19 ecotypes reported by Clément and Leblanc 1984) of fonio has surely led to important amount of indigenous knowledge. Because of scientific neglect, this has never been documented for use by scientific research and development agencies. In order to fill this gap, a survey was conducted throughout the production zones of the country. The study mainly aimed at understanding the socio-economic characteristics of the producers; the agricultural practices used; the production constraints; the landraces diversity, origin, naming, traditional description and classification; the indigenous uses and the traditional diversity management and conservation practices. The finding reported here will further guide genetic diversity studies on this crop and help formulating sustainable promotion and conservation strategies, both *in situ* (on-farm) as well as *ex situ*.

## Methodology

Fifty-five villages randomly selected in the two fonio production zones of the country were surveyed in 2003 (Figure 1). Main criteria used for selecting villages are production, ethnic group and cultural value. Randomness was practiced after selecting the villages that met these criteria. Data were collected during expeditions from the different sites (villages) through the study. Participatory Research Appraisal (PRA) tools and techniques (direct observation, focus group and individual discussions, field visits, administration of questionnaire, etc.) was used, following Guarino and Friis-Hansen (1995) and Christinck et al. (2000). Interviews were conducted with the help of translators from each area. Four-hundred and eighty-seven randomly selected producers (seven to nine males and females per village) were surveyed in the different production zones.

Information collected were related to the socio-economic characteristics of the producers, the agricultural practices, the production constraints, the existing landraces (diversity, origin, naming, traditional description, and classification) and their traditional management, conservation and uses.

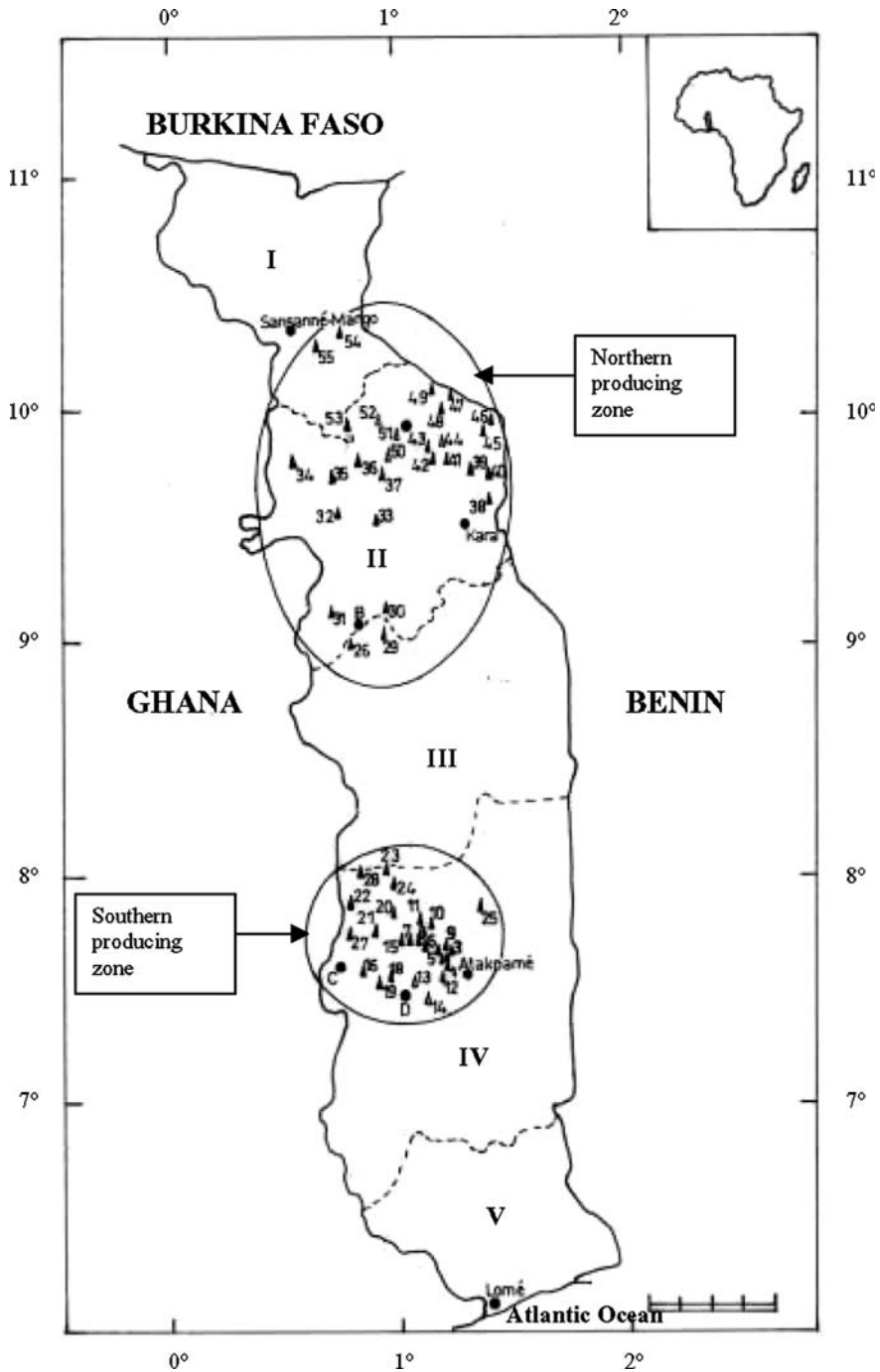


Figure 1. Fonio producing zones and villages surveyed during the study in Togo.

## Results and discussions

### *Current status of fonio production in Togo*

In Togo, fonio millet is produced in three administrative regions organised in two zones: Kara and Savanes regions in the north and Plateaux region in the south (Figure 1). Information (unpublished data) gathered from the National Office of Agricultural Statistics and Documentation of Togo (DSID) places fonio in fifth position among cereal crops after maize, sorghum, pearl millet and rice. The evolution of its production was erratic during the last 20 years when considering the total area cultivated (Figure 2). Since 1996, the total area devoted to the crop has regularly declined (Figure 2) at an average rate of 17% a year. Hence, only 3521 ha were recorded in year 2000 against 11136 ha in 1996.

According to the discussion we had with the farmers during the survey, three major reasons were presented to explain this worrying situation. These are: poor market demand, difficult production and post harvest processing, and rural depopulation. In the northern production zone, many farmers have completely or partially replaced fonio by maize (recently introduced by the national agricultural extension services) for its higher yield and easier production, harvesting, processing and commercialising. In the southern production zone, the reduction of labour supply has led many elder producers to abandon this high labour-consuming fonio crop and devoting themselves to other cash income crops (coffee, cacao, banana, etc.) they normally produce along with fonio as secondary crops.

Contrary to the general situation, fonio production is still very active in certain villages (Défalé and Kadjala in the north; Eliko, Edoko and Ouanibè in the south) where it remains the major food and has a higher sociocultural value.

### *Characteristics of the fonio producers*

Among the 487 farmers interviewed, 11 (2.3%) were less than 30 years old, 196 (40.2%) were in the age group of 30–50 years and 280 (57.4%) were above 50 years old. They belong to seven ethnic groups (Akposso and Akébou in the south; Losso-Nawda, Lamba, Tamberma, Tchokossi and Gangan in the north) of which two (Akposso and Lamba) are known as the most important producers (Adoukonou-Sagbadja et al. 2003).

Fonio growers encountered have very low educational level. Most of them (63.3%) have never been to school, only 9.1% have reached secondary school and the remaining (27.6%) have been to primary school. The great majority (96.7%) of them have farming as the main occupation. Only few farmers (3.3%) are civil servants. A little more than two-thirds (67.8%) of the fonio producers encountered were animists and about one-third (32.2%) were

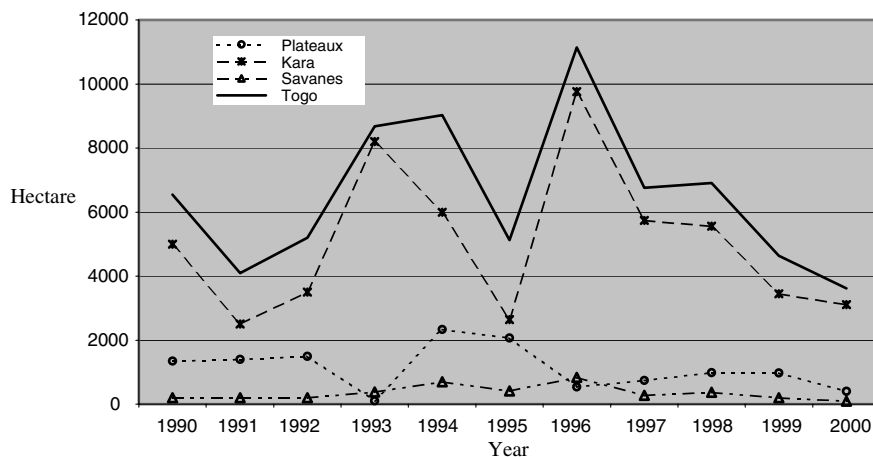


Figure 2. Evolution of area devoted to fonio cultivation in the three administrative regions.

Christians. Such predominance of animists is not surprising as in Togo the crop is associated with numerous traditional beliefs.

Although fonio is known as men crop, an important proportion (39.1%) of women (members or heads of household) were found among the growers. Women heads of household are either widows or divorced.

### *Agricultural practices*

In Togo, fonio is mainly cultivated in marginal, mountainous and hilly zones and on sandy, poor and degraded soils. Many farmers (51.7% of respondents) used rotation cropping system in which fonio, which is more adapted to poor soils, occupies mostly the last place after maize and pearl millet or sorghum. In spite of its high adaptability to poor soils, fonio is rarely cultivated successively more than twice in the same field. Generally, field previously cultivated in fonio is allowed to fallow for 1–2 years. The field left fallow develops weeds and serves as pasture land for livestock in the north (ethnic zones Tamberma and Tchokossi).

In the majority (78.1%) of the fields visited, fonio was found in pure culture. In some cases, fonio was grown in association with other crops such as Bambara groundnut, pigeon pea, pearl millet, sorghum, cassava and okra. In these associations, fonio was the main crop. In only rare case (Tamberma tribe), fonio and pearl millet seeds were directly mixed and sown together: fonio will be harvested first and the pearl millet later.

The sowing time varies among producing zones and depends on the onset of the rainy season. Seed broadcast is the unique sowing method used by the farmers. No fertilizers and pesticides are used by the farmers as fonio flourishes

in poor soils and is, in general, resistant to pests and diseases. In contrast, more attention is paid to weeding because fonio plants are low weed competitors. In most of the cases, weeds are removed (manually) four to five weeks after sowing. The harvest which is the most labour consuming activity occurs between August and October. The harvesting methods vary with the producing zones and the ethnic groups. With the Akposso and Akébou ethnic groups in the south, mature fonio plants are uprooted while in the north, traditional tools (home knives and sickles) are used by farmers to cut straw with mature panicles during harvesting. The Lamba tribe straw cutters for example, use a special craft thimble made with a particular variety of calabash to protect their index fingers against injuries.

Threshing method used to extract grains after harvesting also depends on the producing zones. In the south, fonio is threshed by beating the straw while in the north grains are extracted by trampling dry straw. Because of the intense sunshine during the harvesting period, threshing is done overnight. After threshing, grains are dried 3–4 days and stored in barn. According to farmers the storage duration is about 5–10 years but the seed viability (germination rate) decreases considerably after 2 years of storage.

#### *Gender role in fonio production*

Male and female farmers contribute differently to fonio production activities (Table 1): 50% of the activities (weeding, collecting panicles after harvesting, threshing by trampling, cleaning, drying, processing, and selling) are exclusively done by women while only 14.28% (harvesting and threshing by beating) are exclusively done by men. Therefore, women contribute much more to the activities than men. According to farmers, men do most work that needs more

*Table 1.* Gender importance in fonio production activities.

Activities	Male	Female
Land preparation	High	Low
Broadcasting (sowing)	High	Medium
Weeding	None	High
Harvesting (cutting or uprooting)	High	None
Collecting harvested fonio	None	High
Threshing by beating (south)	High	None
Threshing by trampling (north)	None	High
Cleaning	None	High
Transporting	High	High
Drying	None	High
Keeping seeds for next season	High	Low
Storing for consumption	Low	High
Processing	None	High
Selling (in market)	None	High

Table 2. Major constraints reported in fonio production in Togo (% of responses).

Constraints	Men (%)	Women (%)
Lack of improved harvesting technologies	62.5	2.6
Lack of modern tools for post-harvest processing	10.8	64.2
Insufficient knowledge in weeding system	1.3	11.1
Pests development	15.2	3.7
Attack by wild animals (birds, rats)	0.3	0.5
Insufficient rainfall	9.1	3.2
Decline of the traditional self-help groups	10.8	6.8
Lack of organised market	2.0	7.9
Total	100	100

strength and energy while activities that need more skills and patience are mostly left to women. Because the crop is labour consuming, farmers having large fields of fonio and household of small size always call for assistance. The lack of financial means for labour hiring coupled with task distribution has led to the development of both men and women self-help groups mainly for weeding and harvesting.

#### *Production constraints*

The major constraints reported by farmers are summarised, according to gender, in Table 2. For the majority of men (62.5% of responses), lack of improved harvesting technologies was the most important followed by development of insect pests management (15.2% of responses). For women, the most important constraints were the inexistence of modern tools for post-harvest processing (64.2% of responses) and the insufficient knowledge in weeding systems (11.1% of responses). This gender differences in appreciating constraints in fonio production confirms the distribution of tasks according to the sex as described above. Among the other constraints reported, pest development was the most prominent. Two insects (not found during the survey) that cause at times severe leaf and stem damages in the fields were pointed out by farmers for whom the promotion of the crop should necessarily pass through the improvement of the constraints.

#### *Folk taxonomy and landraces diversity*

In all the producing zones explored, the crop was designated by a generic name (Table 3). These generic names which vary with the ethnic groups mainly highlight the origin of the crop (food from the bush, bush grains for birds) and the quality of the food (good food, small quantity for enough food) it gives (Table 3).

Table 3. Generic names of fonio within the different ethnic groups in Togo.

Ethnic group	Generic name of fonio millet	Meaning of the name
Akposso	Ova	A new food from the bush
Lamba	Afiôhoun	—
Losso Nawda	Kafia / Figm	Small quantity for enough food
Bassar*	Ibibim (Ipi)	Bush grains for bird
Tamberma	Iponaka	—
Tchokossi	Ounvoni	Good food from the bush
Gangan	Ifi	—
Mina, Ewe*	Woxè, Gbekoui	Bush grains for bird

\*doesn't cultivate fonio

In total, forty-two fonio landraces, traditionally classified in three groups according to the growth cycle (early maturing, intermediates and late maturing), were identified in all the different agro-ecological and ethnic zones surveyed (Table 4). To describe and name landraces, farmers use diverse traits. These are related to the growth habit (height and vigour) of the plant, the colour of the shoot, leaves and young panicles, seed characteristics (colour, size, form, brightness and hardness), the growth cycle, and the organoleptic characters. The meanings of local names of most of the landraces were presented in Table 4.

From name meaning and key agro-morphological traits of the landraces (Table 4), it appeared that Lamba (northern zone) and Akposso (southern zone) ethnic zones are the richest in landraces' diversity. On the other hand, the northern production zone with 33 landraces out of the 42 reported by farmers is the part of the country where most of the landraces diversity is concentrated. This finding is in agreement with the report of Portères (1955, 1976) according to which this zone of Togo is one of the important centres of diversification of fonio in West-Africa.

The value of folk taxonomy in plant genetic resources conservation was highlighted by many authors (Van Oosterhout 1990; Berlin 1992; Uguru 1998; Sambatti et al. 2001). Recognising the names farmers give to varieties and understanding the traditional system of classification (folk taxonomic classification) are important because the 'farmer-named variety' is the unit that farmers manage and select over time and the skills with which farmers recognize and manage a given amount of diversity may have important evolutionary consequences for the crop.

#### *Origin of the landraces*

Following Dalziel (1937), Henrard (1950), Portères (1976), Zeven and de Wet (1982), Haq and Ogbe (1995), and Hilu et al. (1997), fonio millet is indigenous to West Africa. Based on the discussion we had with farmers, two schools of thought contribute to explain the current genetic diversity found in Togo (figure 3). For the farmers of the first school, the existing fonio landraces were

Table 4. Fonio landraces inventoried in the different ethnic groups surveyed in Togo and their local name significance and characteristic traits.

Local name	Ethnic group	Significance of the name	Morpho-agronomic traits reported
Afo	Lamba	White fonio	Early maturing landrace (3 months); white seeds.
Adjougouri	Lamba	Produce many tillers	—
Angim	Lamba	—	Late maturing landrace (4 months).
Avecasha	Akébou	Mature quickly	Early maturing landrace (3 months).
Awèrò	Lamba	—	Early maturing landrace
Ayòrò (yòrò)	Lamba	Mature quickly	Early maturing landrace (less than 3 months); white seeds.
Djibiga	Nawda	—	Late maturing landrace (4 months).
Egniva	Akposso	—	Intermediate landrace (3.5 months)
Ezizo	Akposso	Easy to husk	Early maturing landrace (less than 3 months); white seeds.
Fig'm Nawda	Nawda	Small quantity for enough food	Early maturing landrace (3 months);
Folom	Lamba	Hairy and irritated grains	Late maturing landrace (4 months); tiny, rounded and white grains
Fouknum	Nawda	Produce many tillers	Late maturing landrace (4 months)
Gnimimbi	Akébou	Sparkly (grains) fonio	Early maturing landrace (3 months); tiny and easy husking grains.
Hobi	Lamba	—	Late maturing landrace (4 months).
Ipibim (Ipi)	Lamba	Bush grains for birds	Late maturing landrace (4 months)
Ipoaga*	Otamari	—	Early maturing landrace ?
Ipoeda*	Otamari	—	Late maturing landrace (4 months)
Iporlepiah	Tamberma	White fonio	Early maturing landrace (3 months); white gains.
Iporni	Tamberma	Female fonio	Late maturing landrace (4 months)
Ipowan	Tamberma	Red fonio	Intermediate landrace (3.5 months) with reddish grains.
Itamali	Tamberma	—	Intermediate landrace (3.5 months); tiny, rounded and reddish grains.
Ipoyè (Iyè)*	M'bermè	Mature quickly	Early maturing landrace (3 months).
Kantonga	Gangan	—	Early maturing landrace (3 months).
Kayara (yara)	Lamba	—	Late maturing landrace (4 months)
Kiwo	Lamba	—	Early maturing landrace (3 months); rounded, hairy (?) and reddish grains.
Kopordagou	Tamberma	Male (vigour) fonio	Early maturing landrace (4 months); rounded and reddish grains.
Kpéntiki	Tchokossi	—	Early maturing landrace.
Lamfig'm	Nawda	Fonio of Lamba (origin)	Late maturing landrace (4 months), and reddish grains.
Namba	Nawda	Mature quickly	Early maturing landrace (3 months).

Table 4. Continued.

Local name	Ethnic group	Significance of the name	Morpho-agronomic traits reported
Nanam*	Otamari	—	Intermediate landrace (3.5 months)
Oufapôh	Akébou	—	Late maturing landrace (4 months)
Ougniva	Akposso	Fonio with big grains (size)	Intermediate landrace (3.5 months).
Ounfissa	Gangan	Red like blood (grains' colour)	Early maturing landrace (3 months), reddish grains.
Ounvonikpa	Tchokossi	Good cooking quality	Late maturing landrace (4 months).
Ova	Akposso	A new food from a bush (origin)	Late maturing landrace (4–5 months).
Sammao	Lamba	—	Late maturing landrace (4 months).
Sembre	Lamba	Hard but good for food	Intermediate landrace (3.5 months), big and reddish grains.
Tchabigô	Lamba	Mature lately	Late maturing landrace (4 months).
Tchapionga	Nawda	—	Late maturing landrace (4 months)
Tchibam or Tipon	Lamba	Hard to husk	Late maturing landrace (4 months), black grains.
Triakpa	Akposso	Difficult to husk	Late maturing landrace (4 months), big and black grains, difficult cultivation.
Vafoo	Akposso	Easy to husk	Early maturing landrace (less than 3 months); easy cultivation.
Vitchi	Akposso	Fonio of twins (cultural role)	Dwarf; early maturing landrace (less than 3 months); reddish grains.
Yaarang	Nawda	—	Early maturing landrace (3 months) rounded, hairy and reddish grains.
Yolum	Lamba	Fonio harvested in raining period	Intermediate landrace (3.5 months).
Waareh or Waaro	Lamba	Difficult to husk	Late maturing landrace (4 months), big and black grains, difficult cultivation.

\*Landraces documented from some Beninese farmers newly installed in the northern producing zone in Togo.

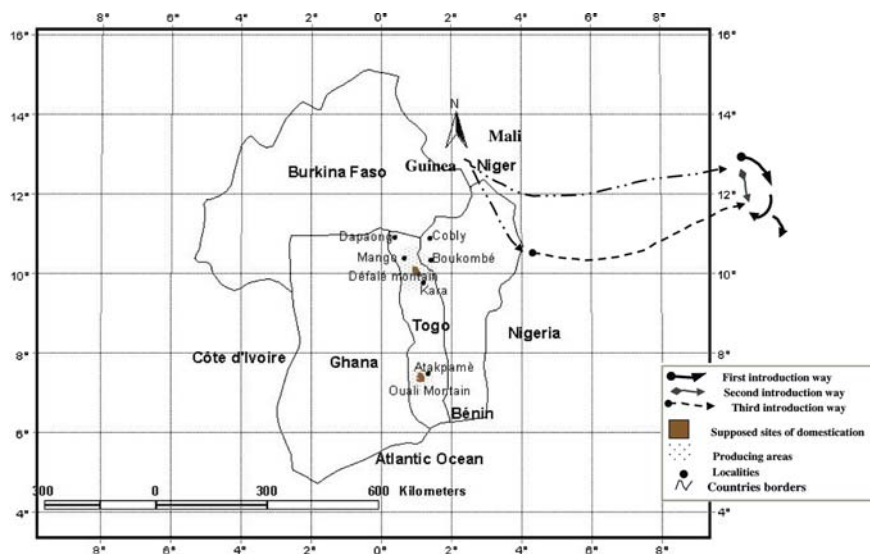


Figure 3. Proposed origins of fonio germplasm cultivated in Togo.

formerly domesticated locally around the mountains of Ouali (near Atakpamé in the South) and Défalé (Doufelgou district in the North) by Akposso and Lamba ancestors who respectively occupied these sites. According to them, wild species known as ‘Birds’ fonio’ (*Djigbla* and *Ovahoui* in Akposso, *Sôhia* in Akébou, *Léto* and *Kanéra* in Lamba, *Gniwinou* in Nawuda, and *Oudjaloun* in Gangan) and consumed in the past as food by the hunters during long hunting trips were used and still exist in the bush (savannah or ancient fallow).

For the farmers of the second school of thought landraces were introduced to Togo from the neighbouring countries (Burkina Faso, Benin, Ghana and Côte d’Ivoire). Three lines of introductions linked to the peoples’ immigration and establishment were reported. The first line was Burkina Faso – Benin – Togo and concerns the ethnic group Tamberma (equivalent of Otamari in the north-west of Benin) located at Nadoba in the north-east of Togo (Figure 3). Farmers reported that ancestors of Tamberma people came from Dinaba in Burkina Faso with some fonio landraces and first established themselves respectively at Coby and Boukoubé in Benin before entering Togo by Nadoba where they are since established. The second introduction line reported was linked to the immigration of Gangan people originated from the south of Burkina Faso. With their series of landraces, these people would have entered Togo by Dapaong in the North (Figure 3) and established themselves in the region of Gando (North). Tchokossi ethnic group established in Mango region was concerned with the third introduction line reported. Their ancestors would be some Baoulé of Côte d’Ivoire who came to Togo via Ghana with their fonio landraces.

Taking into account the two types of explanation, one can hypothesise that fonio landraces cultivated in Togo are derived from both indigenous

domestications and introductions from neighbouring countries (Burkina Faso, Benin, Ghana and Côte d'Ivoire). Similar situation was reported with yam which is also indigenous of the region (Dansi et al. 1999; Dumont and Vernier 2000; Mignouna and Dansi 2003). The historical-ethnobotanical meanings of the generic names given to the crop (Table 3) are in favour of the domestication hypothesis. According to Portères (1976), this domestication occurred in many regions of West-Africa. Therefore, landraces introduced in Togo, as reported by farmers, were also probably domesticated in their countries of origin. A germplasm survey is being organised to identify and collect (with farmers' collaboration) the related wild species of fonio, as these may be sources of useful genes for the genetic improvement of the crop.

### **Indigenous uses**

#### *Fonio as religious and cultural crop*

Like yam in West-Africa (Orkwor 1998) and taro in Hawaii (Matthews 1998), fonio has an important religious and cultural value for its producers. In all the communities surveyed, fonio is the food eaten during the traditional ceremonies. In Akposso and Akébou communities some rituals should be done before sowing, harvesting and eating the new harvested fonio. In these two communities, an important traditional festival called *Ovazu* takes place each year to celebrate their multi-secular cultural links with this crop. In Lamba and Tamberma communities, fonio grains are the most important ingredients in women initiation ceremonies and for the traditional baptism of newborn child. It also plays an important role in the wedding process. To request young woman's hand, a given quantity of fonio should be sent by the man to the family in law. The bigger the quantity of fonio offered, the most sincere and valuable is the bridegroom.

In Akposso and Akébou communities, newly married couple should take together fonio food during the first wedding night and this is done with rituals placed under the auspices of an ancestral fetish named *Kolissa*. This ceremony is seen as a contract of fidelity of the lady to her new husband, and of the man to his family in law. The fetish *Kolissa* is chosen because peoples of these communities believe that fonio was a gift of that ancestral divinity to their ancestors. In fact, according to the history, it is *Kolissa* that indicated bush fonio to their ancestors as good food. This last information is another element that is in favour of the domestication hypothesis highlighted above.

#### *Fonio as food*

Fonio is essentially cultivated for home consumption. It is the staple food crop for most of the ethnic groups surveyed. In Akposso and Lamba communities,

fonio can be eaten three-times a day in various ways. It is also the most important meal used during celebrations or when having guests to lunch or diner. Five different fonio-based diets were recorded during the survey and described in Table 5. The most popular fonio food reported by the farmers (78.2% of respondents) was 'Fonio-beans' or *Ayè* in Akposso language. It is the dish mostly prepared at special occasions for chiefs, dignitaries or guests. The next common fonio meals are fonio couscous (60.5% of respondents), 'fonio-rice' (59.1% of respondents) and fonio porridge (42.7% of respondents). Fonio paste (23.6% of respondents) was mostly consumed in the northern zone. In this zone, fonio is also used, solely or in mixture with sorghum, pearl millet and rarely maize to prepare the local beer named *Tchoukoutou*. As in the tradition high quality *Tchoukoutou* is produced only with sorghum, fonio-based *Tchoukoutou* is seen as low quality drink and is specially prepared for, and use as drink by the farmers (hired labour or self-help group) during the harvest.

#### *Fonio as medicine*

According to farmers, fonio has some medicinal values. It is used to treat or eliminate blood clots resulting from accidents and roughed up injuries or accumulated in the uterus after women deliveries (12.3% of respondents). Fonio is also used to treat chronic diarrhoea (5.7% of respondents), loss of appetite (5.7% of respondents), dysentery (2.3% of respondents), chickenpox (2.3% of respondents), stomach-ache (1.1% of respondents), and asthma (1.1% of respondents). Some people consider fonio as useful diet for those suffering from diabetes.

#### *Other uses*

Fonio's straw is used as a fodder for ruminants, mainly sheep, cattle and goat. It is also used in protecting plant nursery against sun, making mattresses and hay, confecting kitchen, barn roof and jars and in building walls. Some farmers use the ash of the straw as potash for cooking. Some (5% of respondents) also reported the use of fonio grains in feeding poultry, especially young Guinea fowl. According to them, a daily feeding of young guinea Fowl with fonio grains orients their sex differentiation in favour of male.

#### **Traditional conservation of fonio biodiversity on farm**

At the household or farmer level, the number of landraces maintained varies from one to three. In the entire producing zone explored, 85% of the farmers produced only one variety, 10% cultivated two varieties and only 5% had three varieties.

Table 5. Major fonio food products in Togo.

Food forms	Local name (ethnic group)	Freq.in %	Processing description
Fonio-beans	<i>Ayè</i> (Akposso), <i>Warreh</i> (Akébou), <i>Ounvoenialoa</i> (Tchokossi), <i>Fig'in tiram</i> or <i>Dabla</i> (Nawda), <i>Ounkousssi</i> (Lamba)	78.2	Fonio grains are added to boiling pulse and cooked for 10 min. The food obtained is eaten with red oil palm.
Fonio couscous	–	60.5	Fonio couscous is cooked in ready soup, fish or meat could be added.
Fonio-rice	<i>Epoéta</i> (Akposso), <i>Wayôloow</i> (Akébou)	59.1	Fonio is cooked in steam salt water with vegetables (eggplant, cabbage, etc). Red oil palm could be occasionally added before consumption.
Thick and thin porridge	<i>Ounvoenibaca</i> (Tchokossi), <i>Kafuita ndôro</i> (Lamba)	42.7	Fonio grains are boiled in water to obtain a consistence gruel and eaten mixed with honey or sugar.
Paste	<i>Farienpôh</i> (Akébou), <i>Fig'in tag'in</i> (Nawouda), <i>Kafuita moto</i> or <i>Gnabre</i> (Lamba), <i>Ounvoenito</i> (Tchokossi)	23.6	Paste is prepared using fonio grains solely or in mixture with flour of other cereals (sorghum, pearl millet, finger millet but rarely maize).

Each year, farmers' decision-making in the choice of how many and which varieties to grow is influenced by diverse socioeconomic (food availability in the barns, availability of labour), agronomic (grow cycle, yield, easiness in processing, cooking qualities, ability of supporting late harvesting) and cultural (use for special ceremonies as in the case of landrace *Vitchi* in Akposso tribe) factors. Because early maturing landraces mature during the rainy period and must be harvested immediately, farmers producing several crops and having insufficient labour, generally adopt late maturing landraces. Farmers who grew two to three landraces used different fields or different plots within the same field.

Varieties are either inherited from parents and conserved with great care (87.4% of the respondents) or obtained from friends (8% of the respondents) or from local markets (4.6% of the respondents). Each of the households interviewed was self-sufficient in term of seeds. Each year, a certain quantity of seeds is determined per variety and retained on farm from the new harvest to serve for the next sowing. Selected seeds are sun dried and stored in granaries in specific storing jars (that will store up to 50 kg of grains) or in calabashes. According to farmers, fonio seeds longevity in the traditional storage system is about 10 years.

Nowadays, young farmers are less and less taking an interest in fonio as its production, harvest and processing are tedious. Consequently, the risk to see the crop disappeared in Togo in the forthcoming 20 years rise up on the horizon if nothing is done. It is therefore urgent to develop strategies that will promote its production and ensure the sustainable conservation of its genetic diversity both *ex situ* and *in situ*.

## **Conclusion**

In Togo, a long history of fonio cultivation and tradition coupled with high landraces diversity has led to important amount of indigenous knowledge. For the producers, fonio is more than a staple food crop. Its production and consumption are highly linked to the socio-cultural live of the people. Because of diverse constraints, production of fonio millet is decreasing. For the crop to be promoted there is a need to develop modern harvesting technologies and provide women with adequate husking machine. To complement the *ex situ* conservation of the collected germplasm, on farm conservation strategies should be developed. For this to be sustainable, in-depth studies are needed to define its scientific basis.

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