

Development of agricultural varieties: the satisfaction of 60 years of IRAD research on sorghum in the Far North of Cameroon

From 21 to 26 February 2021, a mission led by the Director General (DG), Dr Noé WOÏN, visited the North and Far North regions to assess the results of the last six decades of sorghum research and to make projections for further improvement of the varieties of this cereal, which is clearly of great benefit to the national economy in general and to local populations in particular.

In view of the clearly appreciable results in terms of production and financial resources, the farmers we met in the field are unanimous in recognising that the action taken by the Nkobisson Institute is commendable.

Indeed, to revitalize the sorghum sector, which is very crucial for the food security of the populations of the Far North and for economic growth, the DG of the Institute of Agricultural Research for Development (IRAD) has just led a team to the field.

During this six-day visit to the North and Far North, 60 years of sorghum research were examined by researchers (active and retired) in order to build on the results obtained during these decades of research and to discuss with the various stakeholders (producers, traders, entrepreneurs, media, researchers and students) of the sector.

"The main objective of this mission is to build on the work of several years of research as well as the impact of the results of this research on Muskwari in food security in the Sudan-Sahelian zone of the country," said the Director of Research, Dr Noé WOÏN.



White and red sorghum cobs

Indeed, the Director General of the Institute, the secular arm of the State in terms of agricultural development, was accompanied by a strong team made up of, in addition to his close collaborators from the operational structures of the North and the Far North, retired researchers from IRAD, such as Dr. Jacques Paul ECKEBIL and Dr. Richard

KENGA, who have contributed significantly in their time to the development of many varieties of sorghum and the technological packages that accompany them.

To get a feel for the realities on the ground, the mission visited the villages of Malloum, Lougoul Sambo and the banks of the Benue, among others. From the farmers met here and there, it emerged that the main varieties used are: **Adjagamari, Bourgouri, Madjeri crossbred, Madjeri non-crossbred, Mandoueri, SAF 40 crossbred, SAF40 non-crossbred, Souktari, Soulkeiri and Tchangalari.**

From the discussions with the farmers, it is clear that IRAD's activities in the field have contributed to boosting yields. They acknowledge that it is thanks to the multifaceted support of these professionals that they are doing well.

"With my harvests, I manage to feed my family and the other part, I sell to enrol my children in school", said Gaston GORDJAO, a sorghum farmer in the locality of Malloum.



Researchers accompanied by IRAD's DG in the field

The efforts made by the researchers were also appreciated by the emblematic figure of sorghum research in recent decades in Cameroon, Dr. Jacques Paul ECKEBIL, a researcher who received the Scientific Honours during the 7th edition of the Scientific Year 2020 in Yaoundé. "It has been a renewed effort by IRAD researchers to have the widest possible collection of the main Muskwari varieties, as a basis for everything," he said. And finally, he acknowledged that "sorghum contributes happily to food security in the Far North region".

However, he noted the difficulty of the harvesting process, especially for transplanted sorghum or Muskwari (sown in the dry season without the need to irrigate) and the problems of access to quality seed. "The hard work for Muskwari has always been in the hole-making process. Since each hole is made by hand," adds Dr Richard Kenga.

Food source in the Sudano-Sahelian zone is assured

Sorghum is the main cereal grown in the Sudano-Sahelian zone of Cameroon. It is cultivated on an area of about 70% and its production accounts for nearly 80% of the total volume of cereal production.



Harvesting and storing sorghum for consumption ...

Sorghum is also one of the traditional cereals and is the food base of the Sahelian population. It provides most of the energy and vegetable protein needed by the population in this part of the country. Almost all of the off-season sorghum production (from August for the nursery to February for the harvest) is intended for human consumption (couscous, biscuits, cakes, fritters, porridge, semolina, sucking cobs).

On the other hand, a large quantity of rainfed sorghum is used to make the local drink called "Bil-bil", which is very popular with the people of North Cameroon. There can never be a celebration ceremony in the Great North of Cameroon without the presence of "Bil-bil", an alcoholic drink made from this cereal and corn.

Moreover, many women in this part of the country meet their family needs all year round thanks to the substantial income from the marketing of this local drink, which some people describe as organic because it does not contain any chemical products during its production.



Manufacture of the popular local drink called "Bil-bil"

Prospects. In terms of forecasts, to get the sector off the beaten track, IRAD intends to reintroduce the many Cameroonian sorghum varieties that have been conserved in the gene banks. Not to mention the continued improvement of existing varieties for the characteristics desired by final users.

To achieve this, Dr Noé WOÏN has at his disposal researchers (juniors and seniors) with proven competence, dedication and dynamism.

Sorghum, a virtuous grain. Sorghum, with the scientific name *Sorghum bicolor*, is a species of monocotyledonous plant in the Poaceae family like wheat, rice or millet.

Sorghum originated from Africa, probably Ethiopia, and grows very well in tropical and Mediterranean regions.

It has very long roots that allow it to reach deep into the soil to feed itself and grow. This herbaceous plant can grow up to 3 metres in height. It is cultivated either for its seeds (sorghum grain) or as fodder (sorghum fodder).



A Muskwari field (off-season sorghum) in full production

It is a cereal with many advantages: it is the champion of photosynthesis, which is why certain varieties complete their cycle in less than three months, enabling several harvests per year; it is perfectly resistant to high temperatures, a precious asset in the face of increasing global warming, as it needs 40% less irrigation than maize; its cultivation requires less fertiliser and less work than maize, for the same harvest.

Sorghum flour is recognisable by its distinctive pinkish-brown colour and slightly sweet taste. In the human diet, the seeds are consumed like rice and transformed into alcohol ("Bil-bil") and beer (Guinness...). Reduced to flour, the by-products are biscuits, cakes, porridge, cakes, semolina, etc.

For young people, or even adults, the stalks of wet sorghum are chewed like sugar cane, and pressed to extract a syrup.

In animal feed (forage sorghum), the seeds are particularly appreciated by poultry, cattle, goats, etc.

In the industrial sector, in addition to brewing beer, it is used in the manufacture of brooms and paper.

According to nutritionists, sorghum is gluten-free, which makes it possible to diversify the diet of people suffering from food allergies by varying the types of flour used. In addition, sorghum flour provides starch, protein and dietary fibre which contribute to satiety. It is also rich in minerals such as iron, calcium and phosphorus.

Thanks to its moderate sugar Index (GI 65 compared to GI 95 for white rice flour), sorghum flour is recommended as a mixture in many recipes in order to limit the rise in blood sugar levels.

Like millet and wheat, sorghum is said to have a preventive role against various gastrointestinal diseases. For example, in Africa, sorghum is recommended to prevent the development of gallstones, gastric ulcers and colitis, while Chinese medicine recommends sorghum to tone the stomach and stop diarrhoea. It is also known to treat bone decalcification.

Sorghum varieties available to Cameroonian farmers



- *Adjagamari*
- *Bourgouri*
- *Crossed Madjeri*
- *Madjeri uncrossed*
- *Mandoueri*
- *SAF 40 crossed*
- *SAF40 uncrossed*
- *Souktari, Soulkeiri*
- *Tchangalari ...*

Stakeholders speaking

Dr Noé WOÏN, Director General of IRAD

"In 60 years of sorghum research in Cameroon, the results are visible".



"IRAD has been conducting research on rainfed and transplanted or off-season sorghum in North Cameroon for 60 years. Several scientific achievements have been made by IRAD researchers who have developed high-yielding sorghum varieties that are resistant to disease and water stress. This research has led to the development of some twenty sorghum varieties, including S35, S95, S61 and the famous S54, which was awarded a gold medal in 2016 at the 44th International Exhibition of Inventions in

Geneva, Switzerland. In 60 years of sorghum research in Cameroon, the results are visible.

For some years now, the brewing industry has been interested in the varieties developed by the Institute. I accompanied a team that is going to carry out work in the North and Far North regions to take stock of the situation. They include the agronomic geneticist Dr Jacques Paul ECKEBIL and Dr Richard KENGA, all retired researchers."

Dr Jacques Paul ECKEBIL, retired agricultural geneticist

"Sorghum contributes to food security in the Far North region"



"I discover for the first time, a resumption of research activities on the Muskwari. Practically from scratch. Because all the collections that were made before, are lost. So, it has been a renewed effort by the researchers here to have the largest possible collection of the main Muskwari varieties as a basis for everything. You can't talk about genetic work unless you have a collection of varieties that is as representative as possible of the area.

The main varieties we saw were the basic ones; notably Safari, Muskwari, Djalamari, among others. For Bourgouri, there are fewer. But it is also a Muskwari that is not very popular. Because it gives a coloured lump, which many people don't like. But the main Muskwari varieties that people like are found in the region. This is a commendable effort by IRAD researchers.

At present, the means are available to characterise plant material, not just on the basis of what we see, but also on a biological, molecular level. It seems to me that this is the path that should be followed. Sorghum makes a valuable contribution to food security in the Far North region.

NENWALA, sorghum farmer in Louggol Sambo

"Thanks to IRAD, we have benefited from quality seeds".



"Over the years that IRAD researchers have been advising us on farming techniques, our yields have increased considerably. IRAD provides us with other forms of support, including tractors. Thanks to this state structure, we have benefited from quality seeds. All this has helped us to boost production. On behalf of the people of Louggol Sambo, I take this opportunity to thank the government of the Republic. The good production that we have been experiencing for some time allows us to send our children to school. We also provide for our basic needs and those of our relatives. For its

slightly sweet taste, sorghum is the "sugar cane" of the people of the Grand-Nord. We hope that the technicians of this agricultural institute will continue to assist us, technically...".

Gaston GORDJAO, sorghum farmer in Malloum

"I sow the variety called Madjeri because even if the soil is not fertile I still have a good yield".



"I am a sorghum farmer in Malloum. I grow 2 hectares of transplanted sorghum because it matures at 4 months. So right after that, I can sow rainfed sorghum. I sow the variety called Madjeri because even if the soil is not fertile, I still have a good yield. I have difficulties to get the material (the stake). I would like IRAD to help me acquire materials and herbicides. For the moment, I am doing well, I manage to feed my family and the other part of my harvest I sell to send my children to school. To preserve the seed, as soon

as I cut it, I put the cobs in the bags until the new season before threshing it for sowing.

Rosalie HAWA, producer of the local drink made from sorghum and maize called "Bil-bil" in Salak (Maroua)

"Bil-bil" is a juicy source of income to me".



"I buy a 100-120 kg bag of sorghum or millet for 15,000 CFA francs in the market. The first day, I put my sorghum in water. The second day, I take the millet out of the water and put it on a mat for three days. Then I dry it. When it is dry, I crush it. After crushing, I pour water. And I put my sorghum (sometimes mixed with maize) in big calabashes to cook it at a high temperature. After a long cooking time, I pour the juice obtained into large calabashes, followed by fermentation. On the third day, the resulting product, which is highly prized by the local population (the 'Bil-bil'), is consumed, i.e. put up for sale: with measuring recipients priced between 100 and 5,000 CFA francs. The prices are

really within the reach of everyone. It is a drink that is consumed at all the events that we organise here (weddings, family gatherings, major market days, religious celebrations, libations, etc.).

At the end of the artisanal production of "Bil-bil", I generally obtain about 18 cans of 20 litres (i.e. 360 litres) which bring me about 50,000 CFA francs after sale.

A juicy source of income for me. With this money, I manage to meet the needs of the family, particularly the children's school fees and cases of illness.

Translated by Fonye Anita Epse Nyamdzeka