A comprehensive mapping of the current capacity for human nutrition training in Cameroon

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Background: There is consensus among stakeholders in Cameroon on the need to develop and strengthen human resource capacity for nutrition. This study was conducted to provide a comprehensive mapping of the current capacity for tertiary-level human nutrition training in Cameroon.

Design: Participating institutions included university-level institutions offering dedicated nutrition degree programs or other programs in which nutrition courses were taught. A semi-structured questionnaire administered during in-person interviews was used to collect data on existing programs and content of training curricula. Nutrition curricula were reviewed against the following criteria: intended objectives, coverage of nutrition topics, and teaching methods.

Results: In total, five nutrition degree programs (four undergraduate programs and one master’s program) were identified. Three additional programs were about to be launched at the time of data collection. We did not find any doctorate degree programs in nutrition. All the undergraduate programs only had little focus on public health nutrition whereas the master’s program in our sample offered a good coverage of all dimensions of human nutrition including basic and applied nutrition. The predominant teaching method was didactic lecture in all the programs. We did not find any formal documentation outlining the competencies that students were expected to gain upon completion of these programs. Nutrition courses in agricultural and health schools were limited in terms of contact hours and scope. Public health nutrition was not covered in any of the health professional schools surveyed. We found no institution offering in-service nutrition training at the time of the study.

Conclusions: Based on our findings, we recommend that nutrition training programs in Cameroon be redesigned to make them more responsive to the public health needs of the country.

Keywords: nutrition; training; public health nutrition; capacity; Cameroon

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Introduction

Cameroon is a Central African country with a population of approximately 23 million (1). It is divided into 10 administrative regions (Fig. 1). Life expectancy at birth is 55 years. Cameroon, with a gross national income per capita of US$1,350, is classified as a low-to-middle income country by the World Bank (2).

Important efforts have been made over the past years to raise the profile of nutrition to a high priority in Cameroon. The country joined the Scaling Up Nutrition (SUN) movement in March 2013 (3). The SUN movement supports national governments to work through multisectoral, multistakeholder platforms; align programs toward common objectives and agreed frameworks for results; and mobilize domestic and external resources to foster these efforts (3). Cameroon’s membership of the SUN movement has galvanized political commitment to improve governance and accelerate progress in nutrition. Efforts are underway to develop a coherent multisectoral policy for nutrition, align nutrition programs toward a common results framework, and improve clarity over investments in nutrition and budgeting (3). The Government of Cameroon is also taking steps to create a multi-sectoral platform for nutrition that will be managed at a
higher level in the political hierarchy. A network of parliamentarians for the fight against undernutrition is very active in the country. Much work is being done to leverage additional resources for nutrition through innovative financing mechanisms such as engagement with the private sector (3).

Despite these positive developments, malnutrition remains a serious problem in Cameroon. The prevalence of child stunting is high (32.6%), with nearly 1 million under-five children being affected (4). In addition, 5.6% of children are wasted (4). Micronutrient deficiencies are also common in Cameroon. In a nationally representative survey, the prevalence of iron-deficiency anemia ranged from 12.0 to 47.4% among children and from 9.0 to 19.4% among women (5). The prevalence of vitamin A deficiency among under-five children is 39%, whereas it is 18% among pregnant women (6). At the same time, the country is experiencing a nutrition transition fueled by a rapid urbanization and changes in diet and lifestyle patterns; with an increase in overnutrition and non-communicable diseases (NCDs). Nearly 4% of under-five children in Cameroon are overweight (4). In addition, the proportion of adult women who were overweight or obese increased from 20.7% in 1998 to 31.3% in 2011 (7). The prevalence of hypertension increased 2.3–3.2 times in rural Cameroon and 1.6–1.9 times in urban Cameroon over a 10-year period (8).

Cameroon faces an acute shortage of human resources in the health sector and in their equitable distribution across the country (9). The lack of human resources in the health sector in Cameroon is likely one of the factors hindering Cameroon’s progress in nutrition. Although there is a strong consensus among stakeholders on the urgent need to develop capacity for nutrition at all levels, investments in capacity development initiatives in the country have so far been limited. The recent Lancet series (10) and other studies (11, 12) emphasize the need to strengthen institutional, organizational, and human capacity to scale up nutrition interventions and accelerate progress in nutrition. Failure to develop the needed capacity for action in nutrition will ultimately slow down progress in nutrition in the country. A preliminary step in capacity development is to assess the capacity assets and gaps that exist at individual, organizational, and systemic levels as done recently in West Africa (13–15).

Developing a workforce capacity will not address all capacity gaps in a sustainable manner because capacity development goes beyond workforce development and the training of individuals (15, 16). As described by Potter and Brough (16), it covers a set of three separate but interrelated elements, which are individual capacity (skills and tools), organizational capacity (staff and infrastructures), and systemic capacity (systems, structures, and roles). This paper assesses the current capacity for human nutrition training in Cameroon, in terms of the nutrition programs offered by educational institutions (organizational level) and the skills and competencies acquired by students in the different programs (individual level). The existing nutrition capacity assets and gaps at the systemic level in Cameroon will be addressed in a separate paper.

The paper also highlights existing gaps and challenges in current approaches to nutrition training in the country and proposes practical solutions to address them. The study was commissioned by the Government of Cameroon (Ministry of Higher Education and Ministry of Public Health), with the support of UNICEF, Helen Keller International, and other partners.

Methods

Participating institutions

There were two levels of selection. First, we screened a set of institutions based on a preliminary list that was provided by the Ministry of Public Health, the Ministry of Higher Education, and key in-country informants. These institutions were contacted by telephone or email to check their eligibility. Then, we enrolled those institutions found to run dedicated nutrition degree programs or those offering other programs in which nutrition courses were taught (Table 1).

An official letter was sent to all targeted institutions by their respective line ministries to explain the objectives of the assessment and request their participation. In-person meetings were then scheduled with the representatives of the institutions to gather information about existing nutrition programs or courses. During the meeting, the objectives of the assessment were further explained to the respondents. Interviews were conducted either in French or English.

Data collection

There were two rounds of data collection for this assessment. The first round, which took place in 2013, was conducted in four regions (Center, West, Southwest, and the Littoral). The second round, which took place in 2014, also covered the West region and three other regions (Far North, Adamawa, and Northwest). In total, seven of the ten regions of the country were covered (Fig. 1).

The data collection method used was similar to the one used to assess the capacity for nutrition training in West Africa as described elsewhere (13–15). Data were collected using a semi-structured open-ended questionnaire administered by four experienced interviewers during face-to-face interviews. The questionnaires were completed manually by the interviewers in the presence of the representatives of the institutions (or the persons designated by them). Information was gathered on existing programs and content of training curricula, school ownership, and institutional collaborations. In agricultural
Data analysis

Existing academic nutrition programs in the country were reviewed against the following criteria:

- Outline of the objectives of the programs (skills and knowledge to be taught).
- Coverage of nutrition topics in the curriculum. Three main categories were defined to characterize the areas of nutrition emphasized in the curriculum: basic nutrition, clinical nutrition, and public health nutrition. Basic nutrition was defined as the application of nutrition principles at cellular or organ level and clinical nutrition as the application of nutrition principles at the individual level in clinical settings. Public health nutrition was defined in the context of this study as the use of health promotion approaches and the application of public health principles to nutrition at the population level to prevent nutrition-related diseases, promote health, and improve overall health outcomes (17, 18).
- Training design and teaching method. The prevailing teaching methods were categorized as didactic method (focus on the acquisition of knowledge), problem-based learning (focus on the acquisition of knowledge, abilities, and skills), and a holistic, integrated approach (focus on the acquisition of knowledge, skills, and competencies) (14).

Results

Undergraduate programs in nutrition

In total, four undergraduate programs in nutrition were available in three regions in Cameroon at the time of data collection. These programs were found in Bamenda, Buea, and Yaoundé (Table 2). The University of Maroua was about to launch a bachelor’s program in nutrition at the time of the study.

Table 1. Number of participating institutions and training programs assessed

| Region     | City         | No. of participating institutions | Number of training programs assessed | No. of institutions offering dedicated nutrition courses | No. of institutions offering nutrition integrated into other courses |
|------------|--------------|-----------------------------------|-------------------------------------|--------------------------------------------------------|---------------------------------------------------------------|
| Adamawa    | Ngaoundere   | 3                                 | 6                                   | –                                                      | 1                                                             | 2                                                             |
| Northwest  | Bamenda      | 5                                 | 9                                   | 1                                                      | 1                                                             | 3                                                             |
| Far North  | Maroua       | 2                                 | 5                                   | 1                                                      | 1                                                             | 0                                                             |
| West       | Dschang      | 2                                 | 4                                   | –                                                      | –                                                             | 2                                                             |
| Center     | Yaoundé      | 7                                 | 16                                  | 1                                                      | –                                                             | 6                                                             |
| Littoral   | Douala       | 9                                 | 18                                  | –                                                      | –                                                             | 9                                                             |
| Southwest  | Buea         | 2                                 | 3                                   | 1                                                      | –                                                             | 1                                                             |
| Total      |              | 30                                | 61                                  | 4                                                      | 3                                                             | 23                                                            |
All the programs were established during the 5 years preceding the survey. The program in Bamenda was run by a government-supported institution, whereas the programs in Yaoundé and Buea were run by private institutions. None of the programs was involved in international collaboration for nutrition training or research.

The Yaoundé and Buea programs award a higher national diploma (HND). The Buea and Bamenda programs award bachelor-level degrees. The language of instruction in Buea and Bamenda is English whereas that in Yaoundé is French.

The admission requirements for all the undergraduate programs are a technical or general college education with a science background or any other equivalent qualifications as accepted by the Ministry of Higher Education of Cameroon. The full-time duration of the bachelor degree program in Buea is 3 years whereas that of Yaoundé and Bamenda is 24 months and 60 months, respectively. The HND in Nutrition and Dietetics offered in Buea is of 24-month duration.

The teaching format for all the programs was didactic with little practical training. The program in Bamenda was heavy on basic nutrition and food science, although it included some courses on community nutrition and clinical nutrition. In contrast, the curricula of the Buea and Yaoundé programs emphasized dietetics and applied nutrition. The nutrition courses offered were mainly on food, nutrition, and dietary planning. None of the programs emphasized public health nutrition, or the ongoing nutrition transition in the country, or the attendant rise in NCDs as a key area in their curricula. Furthermore, none of them adequately covered the national protocol for the management of acute malnutrition. The detailed curricula are available upon request.

We did not find any formal documentation outlining the competencies that students were expected to gain upon completion of these programs.

**Graduate programs in nutrition**

The University of Ngaoundere was the only institution offering a graduate program in nutrition in Cameroon at the time of data collection (Table 3). The 2-year program was established in 2010. Courses are taught in both French and English. The admission requirement is a bachelor of science (BSc) degree in biological sciences, nutrition, biochemistry or any other related subjects. The teaching format was mainly didactic, and the program was by coursework. In order to graduate, students were required to undergo a 6-month internship in a professional setting and write a dissertation.

The curriculum offered a good coverage of the key dimensions of human nutrition (Table 4). The curriculum focused on some of the aspects of basic nutrition (nutrition in the life span, nutrition physiology and biochemistry, nutritional assessment, food consumption, regulation of nutrient metabolism, maternal and child nutrition, etc.). It also provided students with the opportunity to gain insights into some of the major aspects of applied nutrition and dietetics (menu planning; diet therapy; cooking techniques; therapeutic nutrition; food consumption studies; applied nutrition). Public health nutrition

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**Table 2. List of universities that provide undergraduate training programs in nutrition in Cameroon**

| City         | Institution                                                      | Ownership | Faculty | Degree awarded                              | Program duration (months) | Year program inception | Language of instruction | Primary teaching method |
|--------------|------------------------------------------------------------------|-----------|---------|---------------------------------------------|---------------------------|------------------------|------------------------|------------------------|
| Yaoundé     | Institut Supérieur des Sciences Biologiques et Appliquées (ISSBA) | Private   | –       | Higher Diploma in Dietetics                 | 24                        | 2011                   | French                | Didactic lecture       |
| Buea         | St. Francis Higher Institute of Nursing and Midwifery            | Private   | –       | Bachelor in Nutrition and Dietetics         | 36                        | 2013                   | English               | Didactic lecture       |
| Buea         | University of Bamenda                                            | Public    | College of Technology                       | Bachelor of Technology-Nutrition | 60                        | 2013                   | English               | Didactic lecture       |
| Maroua       | University of Maroua                                              | Public    | Faculty of Science                          | Professional bachelor's degree in Health and Nutrition | 36                        | The program was about to be launched | French and English | Didactic lecture       |

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was also covered in the training curriculum (60 h in total). As with the undergraduate programs, we did not find any formal documentation outlining the competencies that students were expected to gain throughout the program.

The University of Maroua and the University of Bamenda, two state-owned universities, were also about to launch master’s programs related to nutrition at the time of data collection (Table 3).

Although we did not find any doctorate degree programs in nutrition in Cameroon, we noted that there were some Ph.D. holders who had obtained their degrees in nutrition abroad.

**Nutrition training in nursing, midwifery, and medical schools**

All the nursing and midwifery schools surveyed used a standard nutrition curriculum that was designed by the Ministry of Public Health of Cameroon (Table 5). Nutrition instruction was given mainly during the first year of the nursing and midwifery programs, whereas it was given throughout the duration of the medical school program, especially during clinical years (Table 5). The total amount of time devoted to nutrition was 37 h in the nursing program, 20 h in the midwifery program, and 28 h in the medical program.

Unlike medical schools where nutrition was embedded in other clinical courses, nutrition instruction was delivered mainly as a stand-alone course in nursing and midwifery schools. As with the undergraduate nutrition degree programs, the teaching method for nutrition training in the health professional institutions was mainly didactic, with little opportunity given to students to apply the basic principles of human nutrition to public health practice.

The training content in nursing and midwifery schools was heavily oriented toward basic nutrition. The nursing programs included three courses on food and food groups, nutritional requirements, and nutritional disorders (Table 5). Some of the foods included in the curriculum were not aligned with the eating habits of the population. The midwifery programs included infant feeding, maternal diet, and weaning foods. The medical schools’ programs included breastfeeding, clinical nutrition, infant feeding, and acute malnutrition in children (Table 5). Public health nutrition was not covered in any of these curricula.

**Nutrition training in other university-level institutions**

Several university-level institutions in Cameroon offered nutrition courses as part of the curricula for other programs (Table 6). These included University of Yaoundé I (Faculty of Science), University of Buea (Faculty of Science), University of Douala (Faculty of Science; ENSET), University of Maroua (Faculty of Science; Higher Institute of Sahel), University of Ngaoundere (Faculty of Science; ENSAI; Higher Institute of Technology), and University of Bamenda (ENSET; Bamenda University of Science and Technology). In general, these courses were mostly in basic nutrition and food science, particularly nutritional biochemistry. They were limited both in terms of coverage and duration. However, the programs at University of Bamenda offered good coverage of some of the basic principles of human nutrition (Table 6).

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**Table 3.** List of universities that provide master’s training programs in nutrition in Cameroon

| City                  | Institution                        | Type of institution | Faculty/center                                      | Degree awarded                              | Program duration (months) | Year program inception | Language of instruction | Student intake (2014) | Primary teaching method |
|-----------------------|------------------------------------|--------------------|----------------------------------------------------|----------------------------------------------|---------------------------|------------------------|------------------------|------------------------|------------------------|
| Ngaoundere            | University of Ngaoundere           | Public             | Ecole Nationale Supérieure des Sciences Agro-Industrielles (ENSAI) | Professional master’s degree in Nutrition | 24                        | 2010                   | French and English     | 30                     | Didactic lecture        |
| Maroua                | University of Maroua               | Public             | Faculty of Science                                | Master’s in Food and Nutritional Biochemistry | 24                        | The two programs was about to be launched | French and English     | –                      | Didactic lecture        |
| Bamenda               | University of Bamenda              | Public             | College of Technology                             | Master’s in Nutrition                        | 24                        | The program was about to be launched       | English                | –                      | Didactic lecture        |
Nutrition was also taught in some programs offering degrees in agriculture and related areas. These included master’s programs in animal production (University of Dschang; University of Maroua), Master’s in Crop Production (University of Dschang), and an Agricultural Engineering degree (University of Bamenda).
need to be acquired at each level of nutrition training in Cameroon. This will also require the active collaboration between the training institutions and the employing agencies. This would provide the basis for the revision of the existing training curricula so that they are better aligned with national nutrition priorities and include practical training.

We also found that public health nutrition was only marginally covered in both dedicated nutrition degree programs and in health professional schools. The need to focus on public health nutrition to improve nutrition outcomes in a sustainable manner is of paramount importance. A lack of trained professionals in public health nutrition is one of the factors hindering the implementation of nutrition interventions (19, 24).

Unlike the situation in West Africa, we found no short-term professional nutrition courses in Cameroon. Continuous professional education programs or in-service training are important because they can provide the opportunities for updating knowledge, skills, and competencies in nutrition. However, this approach will only be effective if the basic training of beneficiaries is adequate and sufficient time and resources are allocated to it. Although the capacity for supervisory training, mentoring, and on-the-job nutrition training in Cameroon was beyond the scope of this study, there is also a need to document and improve current practices because most organizations in the country use these strategies to build the capacity of their staff on nutrition.

Even more importantly, individual capacity development efforts need to go beyond training staff from the health sector. Non-medical staff, especially those from agriculture and WASH (water, sanitation and hygiene) sectors, need to be equipped with adequate knowledge on nutrition to help accelerate the delivery of nutrition-sensitive interventions. Training curricula in agriculture schools also need to be reviewed to strengthen the linkages between agriculture and nutrition and provide a platform for scaling up nutrition-sensitive interventions (25).

Our results also revealed that collaboration and networking between training institutions in Cameroon were not well established and need to be strengthened. Enabling closer ties between training institutions inside the country could foster the mobility of students and faculty members across the country (13). However, it is important to clearly define the areas of collaboration so that there are mutual benefits for all institutions involved.

There are several limitations for this study that should be noted. First, our inventory may not have been exhaustive as we covered only seven out of ten regions. However, our best efforts to provide a comprehensive assessment of the current academic nutrition training in Cameroon.

### Table 5. Standard nutrition curricula in health professional schools in Cameroon

| Program              | Nutrition course taught | Distribution of nutrition instruction throughout the curriculum | Teaching format | Status of nutrition courses | Year in the curriculum | Hours of contact for nutrition courses |
|----------------------|-------------------------|---------------------------------------------------------------|----------------|-----------------------------|------------------------|----------------------------------------|
|                      |                         |                                                               | Didactic       | Required                    | First cycle (first year) | 37 30 5 2                             |
| Nursing program      | Food and food groups    | Stand-alone course                                            |                |                             |                        |                                        |
|                      | Nutritional requirements|                                                               |                |                             |                        |                                        |
|                      | Nutritional disorders   |                                                               |                |                             |                        |                                        |
| Midwifery program    | Infant feeding          | Stand-alone course                                            | Didactic       | Required                    | First cycle (first year) | 20 12 6 2                             |
|                      | Maternal feeding        |                                                               |                |                             |                        |                                        |
|                      | Wearing foods           |                                                               |                |                             |                        |                                        |
| Medical program\*    | Breastfeeding and dietary diversification | Integrated with other courses | Integrated system-based | Required               | Second cycle (third year) | 4 4 0 0                              |
|                      | Clinical nutrition and infant feeding | Stand-alone course | Didactic       | Required                    | Second cycle (fourth year) | 20 17 1 2                           |
|                      | Acute malnutrition in children | Stand-alone course | Didactic       | Required                    | Second cycle (fifth year) | 4 0 0 0                              |

*Some nutrition topics were also embedded in other clinical courses in medical schools. The topics are not presented here. Only the nutrition content of the curriculum of the Faculty of Medicine of Douala is presented here. There are at least 10 faculties offering medical training in the country (9).
| City         | Institution                          | Ownership      | Faculty/Center                          | Degree awarded                        | Nutrition courses taught                                      | Number of hours devoted to nutrition |
|-------------|--------------------------------------|----------------|----------------------------------------|---------------------------------------|---------------------------------------------------------------|--------------------------------------|
| Dschang     | University of Dschang                | Public         | Faculty of Science                     | Bachelor’s in Biochemistry            | Human nutrition                                               | 60                                   |
|             |                                      |                |                                        | Bachelor’s in Health Sciences         |                                                               |                                      |
| Buea        | University of Buea                   | Public         | Faculty of Science                     | Bachelor’s in Biochemistry            | Nutrition biochemistry                                         | 60                                   |
| Yaounde     | University of Yaoundé 1             | Public         | Faculty of Science                     | Master’s in Biochemistry (alternative sciences and nutrition) | Nutrition biochemistry                                         | 60                                   |
|             | Ecole des Sciences de la Santé       | Private        | Centre Supérieur des Sciences de la Santé | Master’s in Public Health            | Nutritional epidemiology                                       | 20                                   |
|             |                                      |                |                                        | Master’s in Reproductive Health      |                                                               |                                      |
|             |                                      |                |                                        | Master’s in Nursing Sciences         |                                                               |                                      |
|             |                                      |                |                                        | Bachelor’s in Nursing Sciences       |                                                               |                                      |
| Douala      | University of Douala                 | Public         | Faculty of Science                     | Master’s in Biochemistry              | Nutritional biochemistry                                       | 44                                   |
|             | Higher Technical Teachers Training College (ENSET) |                |                                        | Diplôme de l’Ecole Normale           | Nutrition 3                                                   | 45                                   |
|             |                                      |                |                                        | Supérieure de l’Enseignement Technique | Nutrition and culinary arts                                  | 45                                   |
|             |                                      |                |                                        |                                      | Nutrition and health                                          | 45                                   |
|             |                                      |                |                                        |                                      | Nutrition and food environment                                 | 45                                   |
|             | Institut Universitaire et Stratégies de l’Estuaire | Private       | Institut Universitaire et Stratégies de l’Estuaire | Master’s in Medical Biochemistry     | Human nutrition                                               | 60                                   |
|             | Higher Institute for Nursing         | Private        | Higher Institute for Nursing           | Diplôme Supérieur d’Études Professionnelles en Soins Infirmiers | Nutrition                                                    | 37                                   |
| Maroua      | University of Maroua                 | Public         | Institut Supérieur du Sahel (ISS)      | Bachelor’s level 3 (agrifood)         | Introduction to human nutrition                               | 45                                   |
|             |                                      |                |                                        | Master’s level 1 (agrifood)           | Advanced human nutrition                                      | 45                                   |
|             |                                      |                |                                        | Faculty of Science                   | The program was being validated at the time of data collection | -                                    |
|             |                                      |                |                                        | Master’s in Food and Nutritional Biochemistry |                                                           |                                      |
| Ngaoundere  | University of Ngaoundere             | Public         | Faculty of Science                     | Bachelor’s in Biomedical and Medico-Sanitary | Dermatology-nutrition                                         | 60                                   |
|             |                                      |                |                                        | Master’s in Biomedical and Medico-Sanitary Science |                                                          |                                      |
|             |                                      |                |                                        | Institut Universitaire de Technologie (IUT) | Nutritional biochemistry                                      | 65                                   |
|             |                                      |                |                                        | Diplôme Universitaire de Technologie (DUT) and Bachelor’s in Food Industries and Biotechnology |                                                           |                                      |
| City               | Institution                                                        | Ownership | Faculty/Center                                               | Degree awarded                                      | Nutrition courses taught                                                                 | Number of hours devoted to nutrition |
|-------------------|--------------------------------------------------------------------|-----------|-------------------------------------------------------------|-----------------------------------------------------|-----------------------------------------------------------------------------------------------|--------------------------------------|
| Bamenda           | University of Bamenda                                              | Public    | Higher Technical Teachers Training College (ENSET)          | Food Science and Technology Program/ Home Economics Program | Introduction to nutrition, Human nutrition, Nutritional assessment, Nutrition education and counselling, Disease and therapeutic nutrition, Advanced nutrition, Nutrition and counselling | 30, 60, 45, 45, 120, 30, 45               |
|                   |                                                                    |           | Bamenda University Science and Technology (BUST)            | Bachelor of Technology (Food Science and Technology; Food Science and Technology; Home Economics) | Fundamental of health and nutrition, Nutrition and body weight, Metabolism and energy balance, Nutrition for pregnancy, childhood and adolescence, Nutrition for adults and elderly, Nutrition and physical fitness, Special teaching methods in food science and nutrition, Research seminar in food science and nutrition, Research project in food science and nutrition | 67, 69, 60, 69, 68, 48, 36, 37             |
|                   | Ecole Nationale Supérieure des Sciences Agro-Industrielles (ENSAI) |           | Engineer – Agricultural and Agri-Business Industries Master’s in Science and Technology (with specialization in Food Security and Nutrition) | Human nutrition, Nutritional biochemistry, The state of food security and nutrition in the world (basics and advanced), Nutritional intervention and development, Nutrition education |                                                                                              | 45, 30, 75, 30, 30                       |
|                   |                                                                    |           |                                                            |                                                     |                                                                                              |                                      |
offerings in Cameroon, some programs may have been omitted. However, we believe any gaps are unlikely to significantly affect our findings. Secondly, we do not sufficiently discuss the steps that need to be taken to improve the quality of nutrition training in Cameroon. We are planning to conduct a workshop in Cameroon during which the key results of this study will be discussed with the Government of Cameroon and all stakeholders. This will ultimately pave the way for the development of a consensual action plan that will help to upgrade existing programs and develop new programs that are of high quality.

Conclusions
This study is a first step toward the strengthening of human capacity for nutrition in Cameroon. Our findings highlight the need for a shift in paradigm for nutrition training in Cameroon to be more responsive to the public health needs in the country. Nutrition training programs could be improved by making them more comprehensive in the coverage of all dimensions of human nutrition (basic nutrition, clinical nutrition, and public health nutrition), designing more practical-based training, emphasizing competencies, and harmonizing nutrition curricula to ensure that a minimum set of competencies are present in the workforce. It is also vital to enhance in-service nutrition training for health professionals in the country and support the establishment of new nutrition degree programs to enable an expansion of a nutrition workforce across the country. The Government of Cameroon, through the Ministry of Higher Education and the Ministry of Health, should also take steps to establish standards for systematically monitoring the quality of nutrition training programs to ensure that they are aligned to national nutrition priorities.

Authors’ contribution
RS, FT, and IL conceived the study. RS designed the study and drafted the manuscript. WB and NF reviewed the early draft of the manuscript. All the coauthors contributed to the design of the study, reviewed the study materials, participated in data collection, and contributed to the revision as well as the finalization of the paper.

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The authors declare that they have no competing interests associated with this study. The opinions and points of view expressed in this article are solely those of the authors and do not necessarily reflect the official positions or policies of their affiliated institutions.

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