

# Contribution of Geospatial Data and Technologies in Strengthening of Nutrition and Food Security: The Case of Burundi

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## Abstract

## Original Research Article

Since 2000, the UN Secretary-General called all the countries to use geospatial data and technologies to accelerate the implementation of the Sustainable Development Goals and the achievement of the aspirations of Agenda 2063. Geospatial information is crucial in many sectors for micro-planning, disaster management, environmental protection, navigation, agriculture, trade, land and resource management, infrastructure, and administration. It helps Governments in making decisions using accurate and up-to-date information about geography and location. In this regard, the Government of Burundi has recently set up the National Centre for Geospatial Information Management with one of the missions of promoting the use of geospatial data and the establishment of national geospatial data infrastructures. Thus, all public sectors are recommended to fully benefit from the power of geospatial data and technologies through the proper integration of geography in all services. This paper shows the state of nutrition mapping in Burundi. On the one hand, it highlights the results of an analysis made on the data collected in 2023 and, on the other hand, a comparison with the results of the 2017 mapping in the same sector of activities. The results can enable decision-makers in Burundi to better prioritize, plan, monitor and evaluate the implementation of the nutrition policies. They will also strengthen advocacy for better nutrition and can be used to improve the progress towards attainment of the third Sustainable Development Goal.

**Keywords:** geospatial information, geospatial technologies, mapping, nutrition, food security.

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## 1. INTRODUCTION

Everything happens somewhere. Geospatial data and geospatial technologies can be used to map and monitor soil and crop conditions, and effectively conserve, protect, and manage biodiversity on a global scale [1]. For centuries, maps have been used in many fields such as defence, trade, navigation, land and resource management, infrastructure planning, and administration. Decisions are made based on knowledge of the environment provided by maps; the better the maps the better the decisions [2].

Nutrition and food security have long been a constant concern of Governments and international organizations [3]. Through transformational and exemplary leadership, Burundi is strongly committed to

strengthening the food and nutrition security of the Burundian people through multi-stakeholder synergistic interventions, able to induce perceptible results to guarantee the country a sufficiently productive human capital for sustainable socio-economic development.

A methodology to track investments in nutrition is offered by SUN movement which has already been utilized by several countries in Asia, Latin America and Africa [4].

To better coordinate nutrition and food security at the national level, organizational structures have been created. These structures include the Multisectoral Platform for Food Security and Nutrition (PMSAN) with its Multisectoral Platform Steering Committee

(COPI/PMSAN) and its technical arm, the Permanent Executive Secretariat of the Multisectoral Platform for Food Security and Nutrition (SEP/PMSAN).

After the establishment of these structures, efforts have been made to develop coordination tools. One of the powerful tools is the Second Generation Multisectoral Strategic Plan for Food Security and Nutrition (PSMSAN II) aligned with the National Development Plan (PND 2018-2027) [5] and which was adopted by the Council of Ministers at its meeting on 27 May 2020.

The other powerful coordination tool has been UN-Nutrition's Nutrition Stakeholder and action exercise, which allows the Government to track crucial activities by partners and identify who is doing what ? where ? and how ? This mapping plays an essential role to succinctly indicate the geographical coverage of the different nutrition interventions and the coverage areas of the different stakeholders working in the scaling up of nutrition in Burundi.

The first mapping was carried out in 2017-2018 [6]. It provided information about nutrition interventions and stakeholders throughout Burundi for the year 2017. This mapping was carried out using information collected by a team of technicians from the Government, working in collaboration with an international consultant, and benefiting from the technical and financial support of the Government of Burundi's partners, including the United Nations Children's Fund (UNICEF) and World Food Programme (WFP).

This first edition of mapping 2017-2018 used the Scaling Up tool Nutrition Stakeholder and Action Mapping Tool-SUNPMT.

After seven years, the Government identified the need to update this activity. The reasons for updating the mapping exercise included the desire to have a view of partners activities following the COVID-19 pandemic, and to review the changes and evolution of the national coverage of interventions by stakeholders. Following these priorities, Burundi's Government undertook this

activity with support from UN-Nutrition, and the Food and Agriculture Organisation of United Nations (FAO), which provided the financial and technical support required to complete the technical exercise.

In this paper, we present the results of the mapping based on some of actions in the thirty-one core nutrition actions (CAN) selected during a participatory multi-stakeholder and multi-sectoral workshop. The thirty-one CAN's were chosen based on their agreed-upon impact on the country's nutrition situation. The objectives of the study are : (1) to identify which regions receive each action, (2) to create maps showing the stakeholders supporting each key nutrition action and (3) to realise a comparative analysis between the results of the 2017-2018 mapping and the results from the exercise undertaken in 2023. The results will improve the targeting of nutrition stakeholders in different parts of the country and strengthen actions in the areas of intervention.

The rest of this article is structured as follows : Section 2 briefly presents materials and methods. Section 3 provides the process of collection and preparation of the necessary data. Section 4 presents the results. Section 5 compares the mapping results from 2018 with those identified from 2023 and Section 6 forms the conclusion and way forward.

## 2. MATERIALS AND METHODS

### 2.1 Study Area

Burundi is a country located in east-central of Africa and in south of Equator with a total (land and water) area of 27,834 km<sup>2</sup> and a population density of 432.22 persons per km<sup>2</sup> [7] with 80% of the population employed in the agricultural sector. Burundi is located closely to the equatorial zone, at latitudes between 2°10'S and 4°30'S, and longitudes between 28°50'E and 30°53'E [8].

### 2.2 Key Nutrition Actions

The following table shows the selected key actions and targets.

**Table 2: Selected key actions and targets**

Core Nutrition Action	Target Group of Beneficiaries
Exclusive breastfeeding	Pregnant women and Mothers of children 0-6 months
Advice on complementary feeding	Mothers of children 6-24 months
Dietary advice for pregnant women	Pregnant women
Early Breastfeeding Tips	Pregnant women
Deworming	Children 12-59 months and Children aged 5-14
Distribution of mosquito nets impregnated with long-lasting insecticides (MILDA)	Pregnant women, Households and 9-month-old children
Preventive Treatment of Malaria in Pregnancy	Pregnant women
Immunization of children	Children 5 years old
Setting up Tip Tap for hand washing	Households and Schools
Promotion of hygiene practices	Population

Core Nutrition Action	Target Group of Beneficiaries
Implementation of the Community-Led Total Sanitation Approach	Households
Access to safe drinking water	Households
Vitamin A supplementation	Children 6-59 months
Iron/Folic Acid Supplementation	Pregnant women
Zinc Supplementation	Children under 2-59 months of age with diarrhea who present to the health center
Distribution of micronutrient-enriched powders	Children 6 to 23 months
Food Fortification	population
Cover Power Supply	Children 6 to 23 months
Management of MAM in accordance with national guidelines	Children 6 to 59 months of age with MAM and Pregnant and lactating women (0-6) with MAM
Management of MAS with or without complications in accordance with national guidelines	Children 6 to 59 months of age with MAS
Children 6 to 59 months of age with MAS	Children 6 to 59 months of age with MAS
Screening for malnutrition	Children 6-59 months
Provision of family planning counselling and services	Women aged 15 to 49
Distribution of social assistance by transfer (cash or food)	Vulnerable households with malnourished children < 5 years and/or FE&A, Refugees, Internally Displaced Persons, Returnees, and Vulnerable Households Identified
SILC/SHIG Approach	Households
Support for food storage in households	Households
Support for the implementation of school canteens	Primary schools and preschools
Training and provision of agricultural inputs for food diversification (including vegetable gardens)	Households and cooperatives, Primary Schools
Training and distribution of livestock (big and small)	Agri-pastoralists and Agricultural households
Pond and marsh management	Marsh user households
Availability and distribution of organic and inorganic fertilizers	Vulnerable Agricultural Households

### 3. Datasets

In this study, geographic and beneficiary coverages are estimated based on national statistics and information obtained from key stakeholders who participated in the exercise at the provincial level. Coverage should not be considered exhaustive or fully accurate given that certain data quality issues such as the voluntary participation in the exercise, as well as constraints with data collection time and limited resources. The data collected is for the year 2022 and the following tools have been developed and used for data collection: The data collection questionnaire template and the Metadata Model. The data collection period occurred over four weeks and was completed in all provinces of the country where the collectors were expected to visit all relevant organizations working in the field of nutrition and food security in Burundi. At the end of this task, the collected data was analysed and processed using mapping software.

## 4. RESULTS AND DISCUSSION

### 4.1 Coverage of Geographical Areas

On average, each action is implemented in sixteen provinces. Twenty-five actions cover more than 85% of the provinces. Figure 1. illustrates the geographical coverage of the actions grouped under the following themes: Infant and young child feeding, disease prevention and, water, hygiene, and sanitation.

Forty-four implementation mechanisms have been identified and they are implemented through community and health facilities.

### 4.2 Some Maps of Stakeholders by Key Actions

A total of seventy-four maps were produced as part of this project and some of them have been used in this paper. The two following maps illustrate the geographical coverage related to the advice on complementary feeding Key Action. This action is led by the Ministry of Public Health and is supported by fourteen implementers.

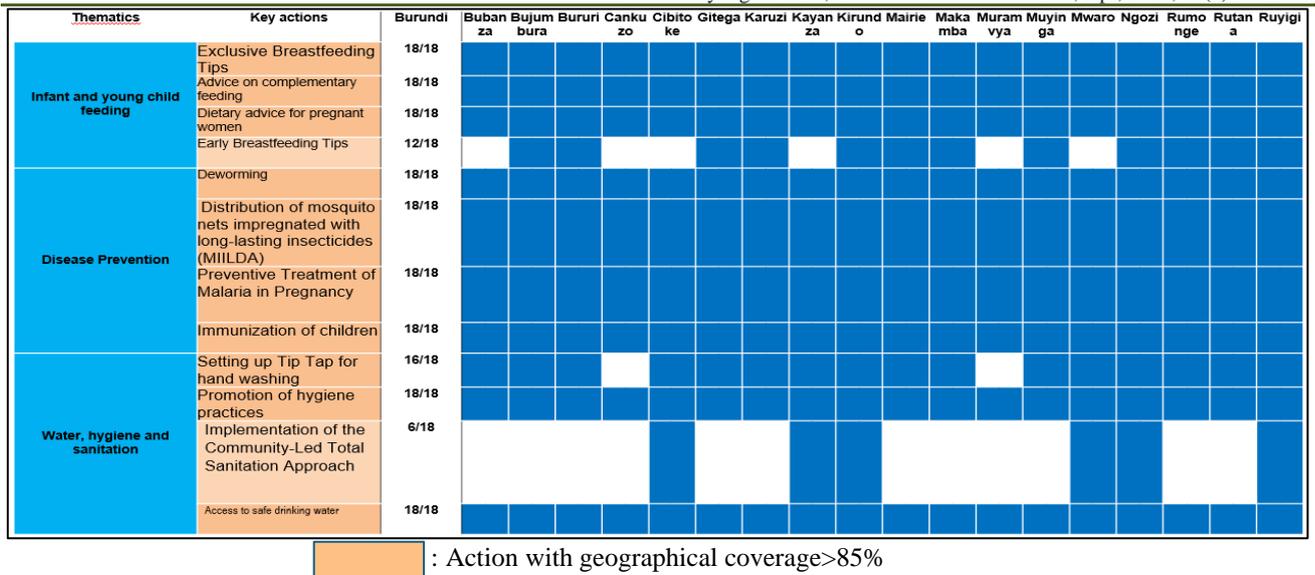


Figure 1: Geographical coverage of the actions grouped under the following themes: Infant and young child feeding, Disease prevention and, Water, hygiene, and sanitation

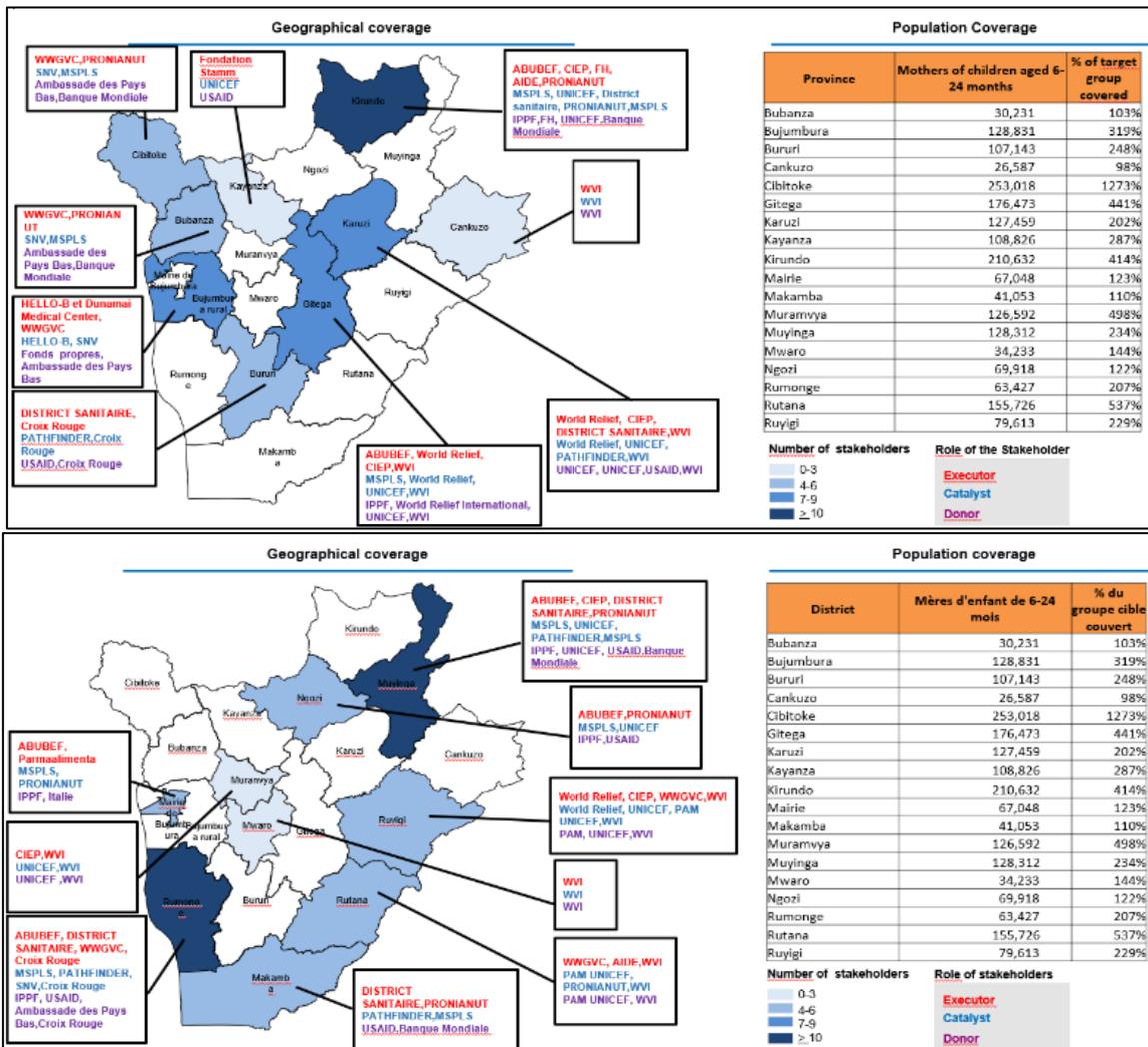


Figure 2: Maps illustrating stakeholders supporting complementary feeding counselling

Stakeholders working on support for household food storage are shown on figure 3. This action is conducted by the Ministry of Trade, Transport, Industry and Tourism, Ministry of the Environment, Agriculture

and Livestock, Ministry of the Interior, Development Community and Public Security, and the Ministry of Hydraulics, Energy and Mines. It is supported by 13 implementers.

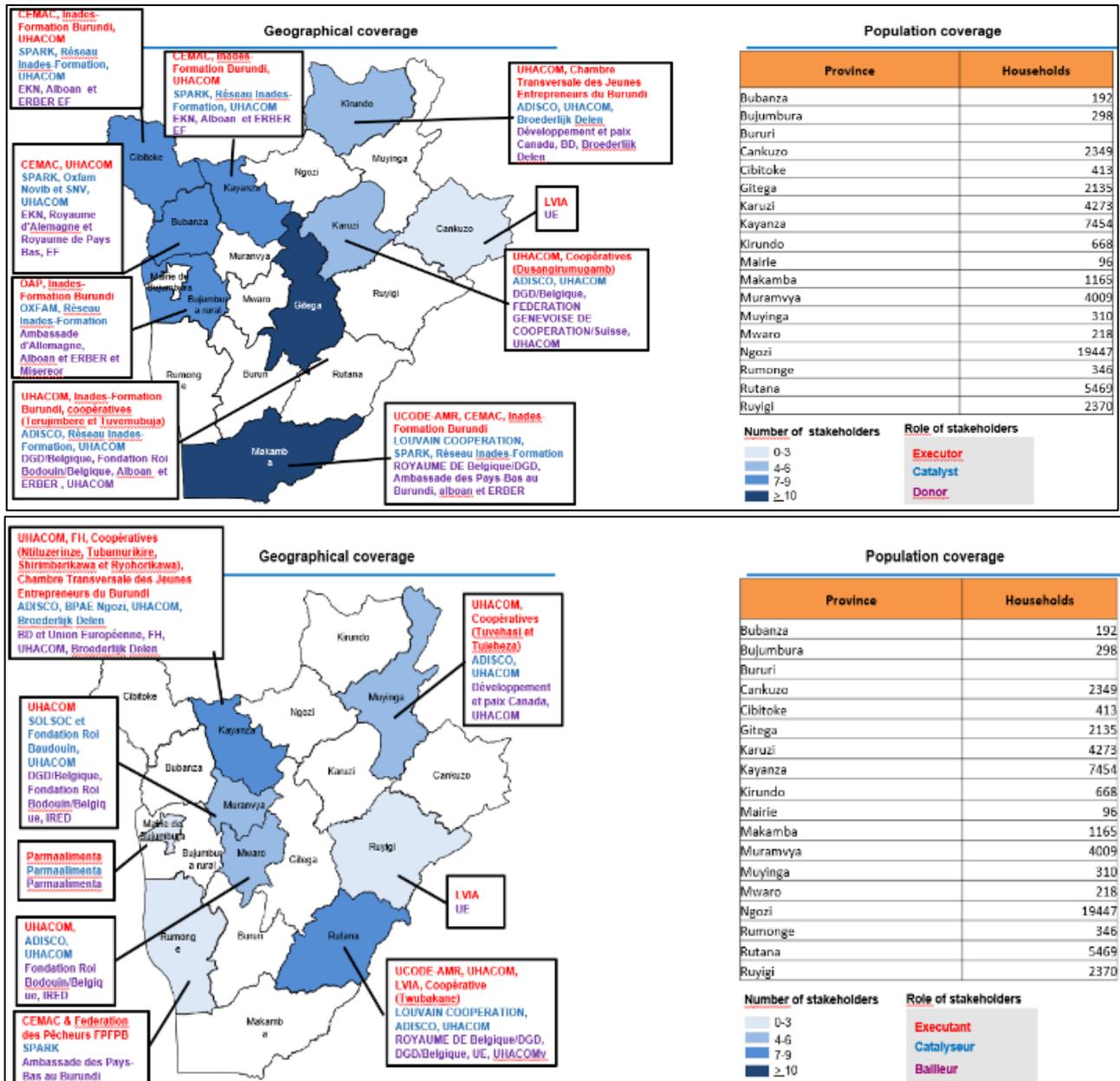


Figure 3: Maps illustrating stakeholders supporting food storage in households

### 5. Comparison of 2018 and 2023 Mappings

As the same approach was used for the 2018 and 2023 mapping exercises, the quality of the results showed marked improvement. In addition, the challenges related to data collection and analysis observed in 2018 have been reduced in 2023.

For example, as illustrated in figure 4, in 2018, the stakeholders involved in exclusive breastfeeding

counselling were concentrated in the north of the country. In the east of the country, except for Bujumbura Mairie, there were fewer responders. The results of the 2023 mapping show that beside of two provinces in the north Muyinga and Ngozi where the number of stakeholders supporting exclusive breastfeeding counselling remained high, the provinces of Rumonge, Makamba, Rutana and Ruyigi in the southeast also recorded more stakeholders.

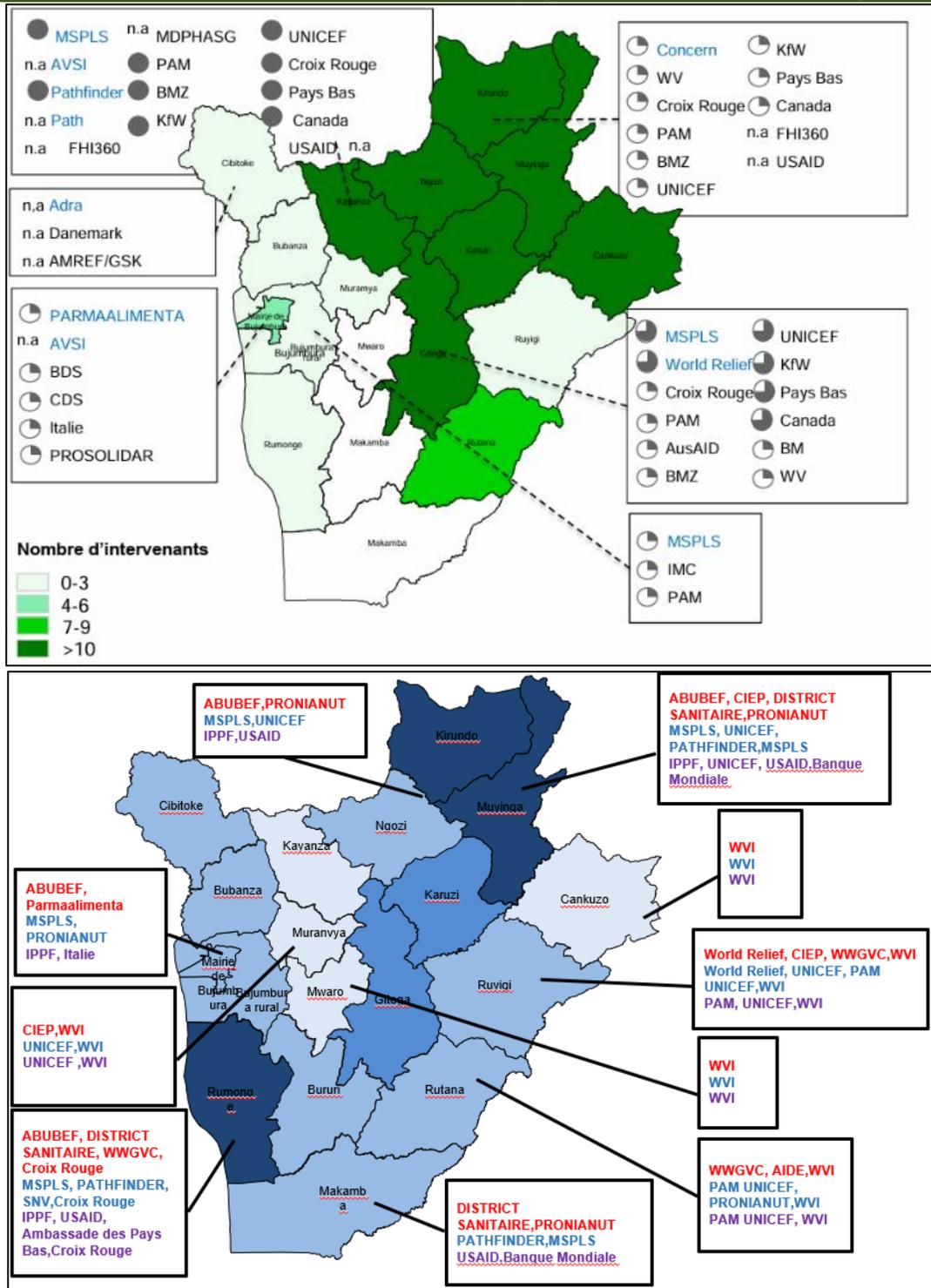


Figure 4: Comparison of maps illustrating stakeholders supporting complementary feeding counselling in 2018 (left) and 2023 (right)

As we can see on the following figure, the number of provinces where school canteens were implemented increased from seven in 2018 to nine in 2023. The two provinces that have been added are Kayanza and Makamba.

It should also be noted that the 2023 mapping exercise identified some key actions that were not considered in 2018 mapping. For example, in 2023, Burundi's Government was interested in identifying support for food storage in households among partners activities, which is a driving concern of the Burundian population.

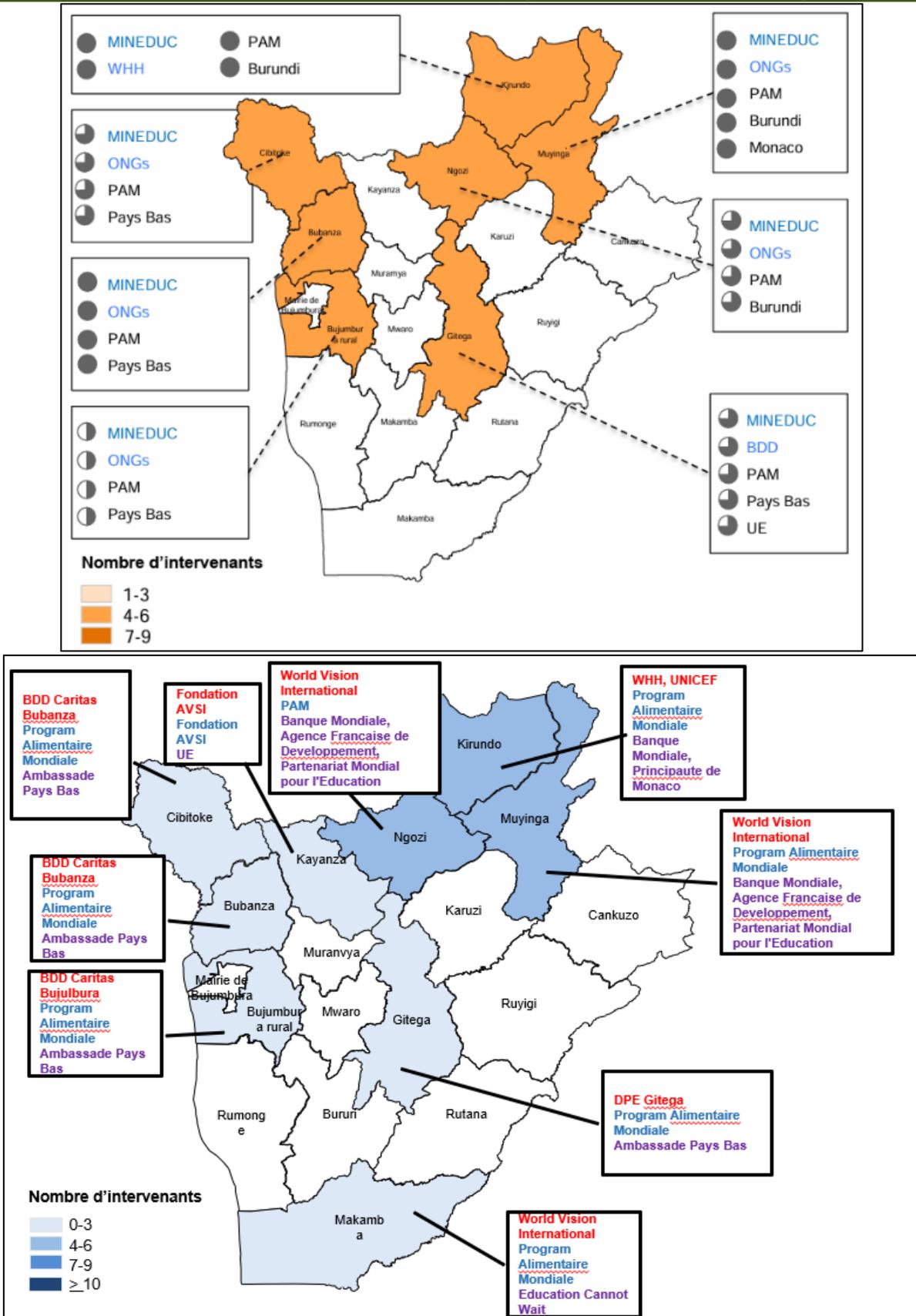


Figure 5: Maps of stakeholders supporting support for the implementation of school canteens in 2018 (left) and 2023 (right)

## 6. CONCLUSIONS

The 2023 mapping of stakeholders and intervention in the field of nutrition and food security in Burundi has led to the following results: 8 Ministries, 62 catalysts, 73 implementers and 50 development partners ensured the implementation of the 31 key nutrition actions prioritized in 2023. Among the 8 Ministries and Provincial Directorates that have ensured the implementation of key nutrition actions in 2023, according to the results of this map, the Ministry of Public Health and the Fight against AIDS is the most involved at the provincial level, all sectors combined. This mapping revealed the existence of areas less covered by a nutrition and food security program and shows the disproportionality in the distribution of nutrition and food security stakeholders and interventions at the provincial level. On average, each action is implemented in 16 provinces. 25 actions cover more than 85% of the provinces. The provinces of Bubanza, Cibitoke, and Kirundo receive the highest number of actions. 44 implementation mechanisms are used. Most of the actions are implemented through the community and health facilities. Thus, the results of this work have made it possible to identify new stakeholders and new interventions for nutrition and food security in Burundi. We were able to determine the scale at which the actions are being implemented and we have identified and updated the gaps in the geographical coverage of the mapped actions in relation to the 2017-2018 mapping. These results are very important for planning the scaling up of nutritional actions, harmonizing interventions for more complementarity while avoiding overlaps.

## Acknowledgements

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