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Benchmarking public policies to create healthy food environments to prevent the double burden of malnutrition in West African countries using the Healthy Food Environment Policy Index: a cross-country study

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Research Article

Keywords: Public policy, Government actions, Policy index, Evaluation Healthy and sustainable food environments, West Africa

Posted Date: April 10th, 2026

DOI: https://doi.org/10.21203/rs.3.rs-8988792/v1

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Additional Declarations: No competing interests reported.

Abstract

Background

West Africa is faced with all forms of malnutrition and there is an urgent need to address this public health issue through strengthening food environment policies.

Objective

This study conducted a regional comparison on the level of implementation of policies aimed at creating healthy food environments in five countries in West Africa

Method

The INFORMAS healthy food environment policy index (Food-EPI) was adapted to take into account the double burden of malnutrition (12 indicators added), and used to assess the level of food environment policy and infrastructure support implementation in Senegal (2017–2019), and in Togo, Burkina Faso, Benin and Ivory Coast (2020–2023). Evidence on the implementation of 47 or 59 good practice indicators of Food-EPI was compiled in each country and validated by government actors. Subsequently, in each country, a series of workshops with a panel of national experts were conducted to evaluate public policies, identify and prioritize actions recommended to governments to create healthy and sustainable food environments. Based on this process, our study compared the process and results.

Results

Countries obtained a higher level of implementation of food environment policies linked to the 12 new indicators of double burden unlike the indicators of the original Food-EPI (n = 47) which were focused mostly on obesity and NCD prevention. Burkina Faso and Ivory Coast obtained the highest number of indicators at a "medium" level of implementation; 42.8% (n = 24/56) and 38.9% (n = 23/59) respectively, while Senegal, Togo and Benin obtained the highest proportion of indicators judged at “low or very low” level of implementation. Policies relating to food promotion, food retail and health in all policies were identified as the main gaps in all five countries. Across the five countries, stakeholders recommended common actions, such as the implementation of an integrated school feeding policy and regulating of the marketing of unhealthy foods to children and adolescents.

Conclusions

In addition to mobilizing national stakeholders and strengthening their capacities, the study demonstrated that countries political priorities focused more on undernutrition, while overnutrition continued to increase in these countries. In this way, it’s crucial to establish a regional agenda of priority actions focus on strengthening existing policies and addressing gaps to reduce malnutrition in all its form in West Africa.

Introduction

In Africa, rapid transformation of food systems and diets are shaped by a driver's factors such as agricultural industrialization, population growth, urbanization, climate change and technological innovations (1, 2). These different socio-economic and climatic drivers have favored, among others, the nutritional transition in many countries including those in sub-Saharan Africa where malnutrition is a public health issue (1, 2, 3). Approximately 875 million African people (84%), do not have access to a healthy diet compared to the world average of 41,9% (4, 5). West Africa remains one of the regions most affected by the triple burden of malnutrition (4, 6). In Senegal, Ivory Coast, Togo, Benin and Burkina Faso, the prevalence of stunting ranges from 17% to 32% (7–12) in children under 5 years old, and anemia affects more than 70% of children and 54% to 64% of women of childbearing age (13–15). At the same time, there is an increase in morbidity and mortality from diet-related chronic non-communicable diseases (NCDs) due to progressive urbanization, transformation of food environments and associated changes in lifestyles and to unhealthy eating habits with and increase consumption of processed foods, sugary drinks etc. (7, 8, 12, 16–20). The prevalence of overweight and obesity has increased significantly in West Africa over the past few decades, affecting both children and adults (16–19) and are major risk factors for several NCDs, including cardiovascular diseases, which are among the leading causes of death worldwide. NCDs are a leading cause of death in west Africa (20).This situation justified the implementation of a regional research project entitled "Evaluation of policies and development of multisectoral strategies to promote healthy and sustainable food environments in West Africa French-speaking, precisely in Senegal, Togo, Burkina Faso, Benin and Ivory Coast" through a research consortium REPSAO (Research Network on Public Policies and Food Systems in West Africa). The aim was to generate evidence to help policy makers better understand food policies and systems, as well as their impact on healthy food environments. In addition, it also allows regional comparisons with other studies already carried out in West Africa (21, 22), in Africa East (23–25), South Africa (26) and South Asia (27) with the Healthy Food Environment Policy Index (Food-EPI) of the international network for food and Obesity/non-communicable diseases Research Monitoring and Action Support (INFORMAS) (28). Indeed, in these five countries, there are currently no monitoring and accountability systems to inform the regulation of food systems and environments linked to NCD. Furthermore, current research based on the Food-EPI module does not address malnutrition in all its forms and certain cross-cutting issues, notably gender in policy evaluation. Indeed, this module does not currently integrate environmental sustainability and gender as criteria into the process of identifying and prioritizing public actions, while the political agenda of international development and research organizations places nutrition, health and equality opportunities at the heart of sustainable development (29, 30). Moreover, in Africa, inequalities between women and men are among the greatest in the world. This study aimed to assess and compare the implementation of public policies related to food environments and infrastructure support in West Africa. Its goal was to identify priority actions that could be recommended to regional governments. The study's purpose was to establish a regional agenda for inclusive policy actions, based on best practices, to address gaps and strengthen food and nutrition policies, with the ultimate aim of reducing the double burden of malnutrition.

Study design and Methods

This regional comparative study is based on data from a multicountry research project that evaluated the level of implementation of public policies in five countries of West Africa using Food EPI. These evaluations were done in 2017–2019 in Senegal (21), and between 2020 and 2023 in Benin, Burkina Faso, Ivory Coast and Togo (31, 32). This study was facilitated by the creation of the Research Network on Public Policies and Food Systems in West Africa (REPSAO) in 2019 during the dissemination of the results of the Food-EPI implementation in Senegal (21). REPSAO was therefore the network within which our study was implemented.

Theoretical Framework of the study

Food-EPI Tool

Food-EPI assesses the level of implementation of government actions to create healthy food environment within two primary components: 1) food environment policies and 2) infrastructure support for development and implementation of food environment policies. Within these components, seven policy 'domains' (food composition, food labelling, food promotion, food prices, food provision, food retail, and food trade and investment) and six infrastructure support 'domains' (leadership, governance, monitoring and intelligence, funding and resources, platforms for interaction, and health-in-all-policies) are assessed, using a set of forty-seven 'good practice indicators' for specific policy areas relevant to each domain (28) **(**Fig. 1). However, the Food-EPI good practice indicators were developed by high-income countries researchers, with a focus on obesity and diet-related non-communicable diseases prevention, while many countries like Benin, Burkina Faso, Ivory Coast, Senegal and Togo are facing a double burden of malnutrition. For this reason, several policy evaluations carried out in Senegal, Ghana and Kenya have recommended adapting the Food-EPI tool to consider the issue of undernutrition affecting these countries (21–23).

Adaptation of the Food- EPI module

To adapt the Food-EPI tool to the African context, a group expert from INFORMAS, along with African researchers on food environments, initiated a process in 2020 to develop and incorporate twelve new indicators into the tool (24, 25, 33). These new indicators were aligned with the World Health Organization's recommendations on breastfeeding and complementary feeding, marketing regulations, national policies addressing overweight, diet-related chronic diseases, undernutrition, and health systems (such as growth monitoring). Additionally, indicators were introduced covering hygiene, water and sanitation (WASH), food retailers and traders, and health safety concerns like microbial and chemical contamination (Fig. 1; Table 3). The new 12 indicators on undernutrition, combined with the original Food EPI indicators were used in the evaluation of policies in Benin, Burkina Faso, Ivory Coast and Togo. Additionally, two new criteria on gender and sustainability were introduced to the process of prioritizing actions, in addition to the three initial criteria (21, 28). These additions aimed to make the prioritization process more inclusive and sustainable, enhancing the overall impact of the Food-EPI tool "**Supplementary material 1**".

Data collection and analysis with Food-EPI

Food-EPI process proposes a dynamic process that actively engages multiple stakeholders in the evaluation of public policies, fostering a learning experience about good practices for creating healthy food environments. This tool also helps establish responsible governance and enables the monitoring and evaluation of public sector policies aimed at creating healthy food environments to combat all forms of malnutrition (28).

The Food-EPI process involved several steps (Fig. 2**).** The project had some unique features of being overseen by a technical regional coordination team. This team facilitated a series of capacity development meetings for national research teams, and these teams also involved the national multi-sectoral nutrition platforms in each of the five countries **(Step1**). The second step involves the collection of relevant documents to inform the good practices indicators and to establish an evidence document. The evidence document is then validated by government stakeholders during a workshop (**Step 2**) (28). Documents can be classified into three categories: i) political framework documents that are considered more general and focused on the presentation of principles or areas of intervention; ii) strategic framework documents that are more concrete and specify the identification of means of

action or specific measures; and iii) operational framework documents are plans or programs that are more limited and more practical.

Next, a panel of experts from different sectors (government and non-government) were invited to rate the implementation level of public policies of their government against the good practice indicators using a Likert scale of 1 to 5 (**Step 3**). Descriptive statistics are used to characterize the panels of national experts. Indicator rating means are calculated to determine an overall percentage of implementation per Food-EPI indicator, domain and component by categorizing the means into four classes according to the level of implementation based on the following: ≤ 25% = “Very low”; 26 to 50% = “Low”; 51 to 75% = “Medium”; and > 75% = “High”. The overall Food-EPI country score is calculated by averaging the scores of the policy and infrastructure support components. The particularity of this study consisted of to analyze and document examples of good practices related healthy food environments based on relevant documents which allowed to evaluate the indicators with a “medium” or “high”. Finally, an inter-rater reliability is calculated in each country but with using of different methods for the analysis (28).

The same experts were invited to identify and prioritize actions to fill gaps or strengthen existing policy actions. First, they jointly determine a list of actions, and then individually prioritize these actions for governments based on five criteria and using a Likert scale of 1 to 5 (**Step 4**) (28) "**Supplementary material 1**". The mean rank score of each action

prioritized across the five criteria was used to determine the top priority actions to recommend to the government in each country. The analysis of the level of implementation of the indicators (very low, low, medium, high) also allowed to identify priority actions targeting the gaps in the implementation of policies and infrastructure in each country. Then, the top ten priority actions by policy component and infrastructure support in each country were extracted, analyzed and compared. Descriptive statistics of each country's expert panels on the elements of the overall Food-EPI implementation process were used to characterize the political implication of national experts. Finally, the processed data was compiled into a report, and the results were shared with stakeholders during a workshop (**Step 5**) (28).

Method to compare Food-EPI across the five countries

Our study conducted a regional comparison of food and nutrition policy implementation by analyzing five (5) variable domains. First, we compared the number of policy documents compiled to establish the policy evidence documents in each country. Second, the profile and participation rate of experts in the two Food-EPI workshops were compared to determine the level of participation and involvement of different experts by sector and gender (28). Third, we compared the level of public policy implementation, including: i) the number of indicators assessed, ii) the highest-scoring indicators, and iii) the overall implementation score for the domains, components, and Food-EPI. Specifically, regarding the comparison of indicators, our study separately compared the implementation levels of the initial (n = 47) and new (n = 12) Food-EPI indicators to better identify progress and gaps in each country. Finally, we identified the presence or absence of good practices among the evaluated policies, as these identified good practices will serve as examples of international good practices for future studies using Food-EPI, especially in low- and middle-income countries. Fourth, we compared the actions identified, prioritized, and recommended to governments, primarily analyzing the highest priority actions based on the criteria, as well as the food environment domains most affected. Finally, the fifth comparison focused on the learning process and policy implication of experts, analyzing indicators related to the declaration and recommendations of national experts during the dissemination of the results.

Figure 1. Components, domains and indicators (n = 59) of the healthy food environment policy index (Food = EPI) used in the five countries with an example of evidence of implementation in Senegal and international best practices of comparison.

(*): indicate the domains that contain the new indicators. Five indicators are in the policy component and seven in the infrastructure support component

Figure 2. Process of evaluating the level of implementation of government policies on food environments based on international best practices using the Healthy Food Environment Policy Index (Food-EPI) in five countries in West Africa, translated from (28).

Results

Policy evidence documents

Out of the hundred and eighty-eight relevant policy documents (n=388) collected and analyzed across the five countries, 35.6% (138 documents) were from the political framework, 23.2% (90 documents) were from the strategic framework, and 41.2% (160 documents) were from the operational framework. Burkina Faso (n=34) and Benin (n=33) collected the most documents from the political framework, while Ivory Coast (n=61) and Burkina Faso (n=53) gathered the most documents from the operational framework (**Figure 3**). These documents provided information on policy implementation for 43 to 59 indicators, depending on the country. It's worth mentioning that Senegal, who conducted its policy evaluation in 2019, used the original set of Food-EPI indicators (n=47), excluding the 12 new indicators on the double burden of malnutrition. In total, 116 national stakeholders were involved in validating the evidence documents: Burkina Faso (n=34), Ivory Coast (n=30), Togo (n=22), Benin (n=20), and Senegal (n=10).

Fig. 3. Distribution of documents collected according to the framework and country

Profile and Participation Rate of expert's panel

A total of 284 government and non-government experts in nutrition, public health, agriculture, trade, academia/research, health and food organizations, and civil societies were invited across the five countries to participate in the Food-EPI workshops, with 214 experts ultimately participating. This corresponds to a regional participation rate of 75.4%, ranging from 50.8% in Senegal to 89.6% in Benin **(Table 1)**. Government experts (Group B) were slightly more represented (Group B, 51.4%) than independent experts (Group A, 48.6%). The highest numbers of independent experts were observed in Ivory Coast (n=29), Togo (n=24), and Benin (n=22), largely due to the presence of a greater number of relevant experts from universities and national research institutions in these countries. Sex representation was uneven, with men comprising 67.8% of participants and women 32.2% across all countries. Subsequently, the same experts (n=268) were invited to the identification and prioritization workshop, with 200 experts participating, representing a regional participation rate of 74.6%. Benin (80%), Ivory Coast (79%), and Togo (78.8%) again had the highest participation rates, while Burkina Faso (71.4%) and Senegal (60%) had the lowest.

The inter-rater reliability for the Food-EPI scoring process was assessed in each country. The results were as follows: Senegal (0.75; 95% CI: 0.70–0.80), Togo (0.89; 95% CI: 0.84–0.94), Ivory Coast (0.93; 95% CI: 0.90–0.96), Benin (0.94; 95% CI: 0.92–0.97), and Burkina Faso (0.96; 95% CI: 0.94–0.97).

Table 1: National panel of experts who evaluated policies, proposed and prioritized actions in five countries of West Africa

Level of policy and infrastructure support implementation across the five countries

Among the indicators of the initial Food-EPI tool, **47 indicators** were evaluated in **Benin, Ivory Coast,** and **Togo**, while **44** and **43 indicators** were assessed in **Burkina Faso** and **Senegal,** respectively. **Ivory Coast**and **Burkina Faso** recorded overall Food-EPI implementation scores of **44%** and **46%,** respectively. In contrast, **Senegal, Benin**, and **Togo**presented and overall Food-EPI implementation scores considered "low," at **36%** for Senegal and Togo, and **39%** for Benin. These three countries also recorded the lowest implementation scores for the policy component and infrastructure support, ranging from **31% to 35%** and **39% to 44%,** respectively **(Figure 4).**

Fig.4. Level of implementation of overall Food-EPI and according to the policy and infrastructure support component in the five countries

Table 2 shows the results of the level of the implementation of specific policy and infrastructure domains across the five countries. Within the policy component, food promotion and food retail were attributed the lowest levels of implementation across all five countries, each scoring 31%. Conversely, food provision policies achieved the highest average implementation level at 43%. Notably, food provision was the only policy domain rated as medium implementation (55%) in Burkina Faso **(Table 2a)**. In the infrastructure support component, the domain "Health in All Policies" recorded the lowest implementation level at 41%. Meanwhile, platforms for interaction and leadership were ranked scored higher, at 51% and 48%, respectively. Importantly, none of the domains within this component were rated as "very low" in any country. Several infrastructure support domains—including Leadership (LEAD), Governance (GOVER), and Platforms for Interaction (PLATF)—were rated as "medium" in several countries, indicating moderate progress in these domains (**Table 2a**).

Table 2: Level of Policy and infrastructure support implementationcompared to international good practices for the Food in the five countries**.** Dark red (very low 0 ≤ 25); Red (low 26 ≤ 50%); Green (medium 51 ≤ 75%); Dark green (high > 75%),

Looking only at the domains of the 12 new indicators on undernutrition (COMP3, PROM4, PROV5-6, RETAIL5, LEAD6-9 and MONIT7-9), countries generally demonstrated **better implementation level results** (**Table 2b**). However, Benin was the only country where food retail was rated very low (25%) and Togo was the only one where all domains of the new indicators, except leadership, were rated "low". Burkina Faso (n=6) and Ivory Coast (n=5) presented the best implementation level among the 6 domains of the new indicators (**Table 2b).**

This distinction between the two groups of countries is more remarkable when comparing the level of implementation of Food-EPI indicators by country (**Figure 5 and Table 3**). Among the 59 indicators, Burkina Faso and Ivory Coast obtained respectively 42.8% (n=24/56) and 38.9% (n=23/59) of indicators with a level of implementation " medium ". Togo (n=10) and Benin (n=19) obtained fewer indicators rated as 'medium'. However, Senegal had assessed 43 indicators and two were rated medium. However, most countries had policy and infrastructure support indicators rated as "low" (**Figure 5**).

In the policy component, no country had an indicator judged as "high". However, all countries had at least one indicator rated "medium", but this number was higher in Burkina Faso (n=5) and Côte d'Ivoire (n=4). These indicators rated "medium" were for Burkina Faso (PROV1-3, LABEL1, PRIX3), Ivory Coast (PROV1, PROV3, LABEL1,2), Benin (PROV1, LABEL1), Senegal (LABEL1) and Togo (PROV1). Senegal had the highest proportion of political indicators rated as very "low" (42.9%). On the other hand, the proportion of political indicators rated as "low" was higher in all countries, especially in Togo (**Figure 5).**

Figure 5: Proportion of policy indicators (a) and infrastructure support (b) with “very low”, “low”, “medium” or “high” implementation in each country compared to international best practices (n=47).

In the infrastructure support component, Burkina (LEAD1 and PLATF1) and Ivory Coast (LEAD1) were the only countries with indicators rated "high” (**Figure 5**). In addition, Burkina Faso (n=11), Ivory Coast (n=11) and Benin (n=8) were the countries with a higher number of indicators rated "medium” and “LEAD1” was the single highest-rated indicator

across all countries. For example, the following indicators were considered as “medium”: Burkina Faso (FUND1-3, PLATF2-4), Ivory Coast (PLATF1-3, LEAD2-5), Benin (LEAD4-5, MONIT3, PLATF) and Togo (PLATF1). Finally, Senegal (95.6%) and Togo (79.2%) had the highest proportion of indicators with a "low" level of implementation unlike the other countries (**Figure 5**).

Concerning the level of **implementation of the twelve indicators** for the double-burden of disease, Burkina (n=4) and Côte d'Ivoire (n=3) had the highest proportion of indicators with a level of implementation “medium” among the five indicators in the policy component and no indicator was assessed with a level of implementation considered “high”. However, national policies aimed at promoting WASH access (PROV6) were assessed “medium” in all the countries. (**Table 3**). Among the seven indicators of the infrastructure support component relevant to undernutrition, all countries recorded a significant number of indicators rated “medium” for Benin (n=7), Ivory Coast (n=6) and Togo(n=4). However, Burkina Faso was the only country where the indicators were rated “medium” (n=5) or “high” (n=2). Burkina Faso (62%) and Côte d’Ivoire (52%) were the only countries where policies restricting the marketing of breast milk substitutes (PROMO4) were rated “medium”. Policies facilitating breastfeeding in workplaces and public places (PROV5) were identified as the most important gaps in all countries (**Tableau 3).** Finally, examples of good practices to be promoted were identified, documented (n=88) from these results and resulted from indicators (n=13) having a level of implementation considered “medium” or “high” "**Supplementary material 2**"

Table 3. Level of implementation of the 12 new indicators by country

Actions prioritized and recommended to governments

Overall, 744 actions were identified by experts from the five countries, and 502 actions were prioritized, i.e. 67,5% of the actions identified to improve food environments and reduce the double burden of malnutrition. The proportion of priority actions linked to the policy component and infrastructure support indicators with “very low”, “low”, “medium” and “high” implementation is shown in **Figure 6**. In all countries, a small proportion of priority actions (8,0%, n=40/502) concerned indicators whose implementation was judged “very low or non-existent” and this varied from 1,6 % (n=2/123) in Burkina to 33,3% (n=15/45) in Senegal. Likewise, only a small proportion of priority actions (between 0% and 1,8%) concerned indicators whose implementation was assessed as “high” compared to the good practices indicators. Most of priority actions (59,2%, 297/502) concerned indicators whose implementation was considered “low” compared to good practices. This proportion varied from 44,7% (n=55/123) in Burkina to 72% (n=72/100) in Togo (**Figure 6).**

Fig.6. Proportion of priority actions linked to indicators of the policy component and infrastructure support with “Very low or non-existent”, “low”, “medium” and “high” implementation.

Among these 502 prioritized actions, 55,8% (n=280) were from the policy component and 44,2% (n=222) were from the infrastructure support component (**Figure 7**). In the political component, 17,9% (n=50) of the actions were linked

to the five (5) new indicators “COMP3, PROM4, PROV5, PROV6, RETAIL5”, whereas this proportion was 22,1% (n= 49) in the infrastructure support component **(Figure 7**).

To compare the prioritized actions across the five countries, the first ten key priority actions of each country and by component were examined (**Figure 7) and** "Supplementary material 3".

Priority policy actions

For the policy component (PC), experts from all five countries mainly expressed interest for food provision policies (44%; n =22/50), food promotion (24%; n= 12/50) and food composition (18%; n = 9/50) (**Figure 7).**

The 22 recommended actions on food provisions came mainly from Benin (n = 5), Burkina Faso (n = 5), Togo (n = 5) then Ivory Coast (n = 4) and Senegal (n= 3). Food provision policies were identified in all five countries as a priority aimed at strengthening school food policy through the implementation of an integrated school feeding program combining an institutional food supply from local producers, the development of menus and nutritional standards based on local foods and nutritional education, as well as technical and financial institutional support. For example, experts in Benin proposed the evaluation of the quality of the provision of food services in public structures (school canteens; military services, prison services, university services, hospitals etc.) to promote healthy foods. In Senegal, experts suggested the development and implementation of nutritional standards for meals offered at the food service level (universities, hospitals, prisons, etc.). In Togo, experts proposed the finalization and adoption of the national healthy and balanced diet policy in school, extra-curricular and university environments (**Table 4**).

The 12 proposed actions on food promotion mainly came Burkina Faso (n=3), Ivory Coast (n=3) and Togo (n=3). Benin and Senegal respectively had two and one priority action in this domain. For public policies aimed at reducing the impact of the promotion of unhealthy foods among children, expert’s priorities focused on the evaluation of the exposure level exposure children to the advertising of unhealthy foods through broadcast media (TV and radio) in Benin and Senegal; ii) the development of regulatory texts prohibiting the advertising of unhealthy foods in the living environment of children in Burkina Faso; iii) the development of a decree clearly defining authorized (healthy) and unauthorized (unhealthy) foods for advertising to children in Togo. In addition, the interests of the experts also focused on: i) the adoption of a law for food in schools and preschools and to make functional the National Committee for the promotion, protection, support of Breastfeeding and the development of Early Childhood in Ivory Coast; and ii) the development and adoption of a text relating to breast milk substitutes in Togo. (**Table 4**).

Finally, for the composition of foods, Senegal (n=3), Burkina Faso (n=2) and Togo (n=2) had more prioritized actions compared Benin (n=1) and Ivory Coast (n=1) (Supplementary material 3). Furthermore, in the political component, 24% (n=12) of priority actions recommended to governments were linked to five new indicators on undernutrition. This percentage of 24% would explain, among other things, the interests shown by experts in public policies linked to the problem of undernourishment (**Figure 7).** Concerning public policies governing food composition, national experts focused their political priorities on i) the development of food composition table in Senegal and Togo; ii) the development of a national standards document on nutrients of concern in foods in Benin; iii) the definition of a model of good practices and nutritional standards by focusing on the content of nutrients of concern in foods offered in fast food establishments in Senegal; iv) training and raising awareness of catering stakeholders in good culinary and nutritional practices in Ivory Coast; and v) make compliance with food standards including infant flour mandatory and adopt a monitoring plan for food enrichment programs including infant flour in Burkina Faso (**Table 4**).

Fig.7. Policy and infrastructure support actions recommended to governments (ARG) including those linked to new indicators (ANI) as a proportion of the total number of actions retained (AR) in all five countries.

Infrastructure support actions

For the infrastructure support component, the priorities experts focused mainly on political leadership (n=23) and monitoring and evaluation (n=17) while the regional level of implementation of these two domains was respectively 57% and 50%, which remained relatively better compared to other domains (**Figure 7**).

The 23 recommended actions came Burkina Faso (n = 7) and Benin (n = 6) and then Ivory Coast (n = 4), Togo (n = 4) and Senegal (n=2). Concerning leadership, national stakeholders focused their political interests on i) the development of national dietary recommendations and the food guide based on the results of national food consumption surveys in Burkina Faso, Senegal and Togo; and ii) strengthening nutrition financing by advocating for a budget line allocated: a) to the fight against diet-related non-communicable diseases in Benin; b) for nutrition in Burkina Faso; and c) for the purchase of iron, folic acid and calcium for supplementation of pregnant women in Togo (**Table 4**)

For monitoring and evaluation, the 17 proposed actions came mainly Togo (n=6) and Senegal (n=5). The other countries each had 2 actions "Supplementary material 3". Furthermore, in the infrastructure support component, 20% (n =10) of priority actions recommended to governments were linked to seven new indicators on undernutrition **(Figure 7)**. Concerning monitoring and evaluation,national stakeholders in BeninandSenegal identified as a political priority the need to conduct a national food consumption survey**.** This would help define specific objectives related to nutrients of concern and inform thedevelopment and guidance of national food and nutrition policies**.** Additional country-specific actions included: in Benin the establishmentof anational food environment monitoring system**,** with a focus on food compositionandnutrients of concernand the nutritional quality of food served in public catering services (e.g., schools and other institutions); inBurkina Faso,periodic assessmentof the quality of food served incanteens and restaurantsand the Development of a regulatory framework on food safety; in Côte d'Ivoire the development of a national food safety policy and implementation of a food safety monitoring system and in Togo, allocating a budget dedicated to surveillance of the population's nutritional status, including obesity, micronutrient deficiencies and related health issues. The common priority or complementary actions to the different countries according to the priority domains are presented in **Table 4**.

Table 4. Recommended common or complementary priority actions

Process learning and implication politique

Overall, the institutional ownership of the project and the results by the multi-sectoral nutrition platforms was an important element of policy implication likely to lead changes in the policy development process and the practice of nutrition for public health in the five countries. Furthermore, national stakeholders in all five countries declared that the implementation of Food-EPI promoted a process of learning (95 in Burkina Faso to 100% in Benin and Togo), knowledge and capacity strengthening (92 in Senegal to 100% in Benin and Togo) and these elements can contribute to changes in policy interests and practices beneficial to the countries (84% in Senegal to 100% in Ivory Coast) and they showed an interest to repeat thy study in order to monitor the Government's progress (92% in Senegal to 100% in Burkina Faso and Togo. Finally, during the dissemination of the results, the stakeholders showed an interest about the project and made recommendations aimed at taking ownership of the results to carry out the actions recommended to the government in the future years. The **Table 5** below summarizes some recommendations that involve national multi-sectoral nutrition platforms.

Discussion

Food-EPI offers a dynamic process to mobilize and involve several stakeholders of different sectors in the evaluation process of public policies in a given country. It allows to establish responsible public governance, monitoring and evaluation of public policies and actions aimed at creating healthy food environments to combat obesity and diet-related chronic diseases. In addition, it allows to carry out comparisons between countries and to identify international best practices (28).

As shown in this paper, five countries in West Africa have successfully carried out an evaluation of their public policies using the Food EPI module. A large number of policy documents collected through a broad-based approach have been used to compile evidence documents on which panels of stakeholders from different sectors of government and academia, national research institutes, organizations and civil society based their assessment of government policy efforts towards a healthy food environment. Strong stakeholder commitment was noted with a high regional participation rate. This strong mobilization of stakeholders was attributable to the political involvement of the national multi-sectoral nutrition platforms which supported the academic research teams in the implementation of the project. Such a participatory approach in the process of evaluating public policies seemed to be ideal to train and generate the commitment of stakeholders for the political appropriation of research results. In other countries that have carried out this same process, such as South Africa, Mexico, Kenya, Chile, Singapore, Bangladesh and India participation rates were well below those observed in the five countries (23, 34, 26, 27). However, countries obtained better results in implementing policies related to the 12 new indicators linked to the double burden of malnutrition unlike the indicators of the initial tool Food-EPI tool. Indeed, the priorities and political efforts of the countries in terms of nutrition focused mainly on the five policies aimed at combating undernutrition, i.e. the indicators “PROV6 and LEAD6-9”. These indicators obtained the best results (were rated as “medium”) in all the countries compared to the other indicators and their level of implementation regional ranged from 61% to 69%. These results were similar to those obtained in South Africa regarding the "LEAD 6" indicator, but contrary to the results of the LEAD7-9 indicators in South Africa, which were rated as “low”. Finally, policies facilitating breastfeeding in workplaces and public places (PROV5) were identified as the most important gaps in all five countries and in South Africa too (26).

Our results demonstrate that the Food-EPI is an adaptive tool that allows to address the public health priority in the development and implementation of food and nutrition policies. Indeed, the recommendation made by stakeholders during the implementation of Food-EPI in Africa aimed at adapting the tool to considering the double burden of malnutrition, was justified through these results (21–23). Furthermore, these results show that the political interests of stakeholders remain more focused on undernutrition although countries still face problems of obesity and diet-related chronic diseases. Most countries had a “low” level of implementation for the policy component indicators unlike those for infrastructure support and no country had an indicator with a “high” level of implementation in the political component. Our results corroborate with those observed in African and European countries, where most policy indicators were rated “very low” or “low”. Countries like Germany, Ireland, Netherlands and Poland are among the 11 European countries that did not have any indicator rated as “high” in their Food EPI evaluation (35, 26).

However, in all five countries studied, important policy gaps were noted in food retail, food promotion and food composition policies. These policies were rated as “low” compared to international good practices and were also rated as “low” in Ghana (22). In addition, health in all policies was also identified as an important gap in all five countries. Elsewhere, Food-EPI results from 11 European countries were also better in implementing infrastructure support unlike implementing policy component and food retail and health in all policies were noted as gaps compared to other domains in these 11 countries (35).

All five African countries got better results in implementing food provision policies, especially school feeding policies, and policies linked to political leadership of infrastructure support, especially the “LEAD1” indicator. Furthermore, compared to good practices, Ivory Coast and Burkina Faso were considered the best performers on several indicators of the two Food-EPI components. Senegal and Togo especially, but a little less Benin, had the highest proportion of political indicators considered “very low” for the politic component or “low” for infrastructure support. However, a greater proportion of infrastructure support indicators were rated “medium” in Burkina Faso and Ivory Coast than in Benin, Togo and Senegal.

Moreover, as in Ghana, Malaysia and 11 EU countries, variability in policy implementation has also been noted. (22, 35, 36). Indeed, the implementation of policies related to food environments was also rated low in Malaysia et Ghana (22, 36). Slovenia, Poland, Germany, Netherland and Spain had the highest proportion of political indicators rated “very low” or “low” (35). The best performing European countries were Finland, Norway and Portugal with higher proportions of policy indicators rated “high” (35). Regarding infrastructure support, most European countries had a "medium" level of implementation and Finland and Ireland were the only countries with a "medium" or “high” level of implementation for all indicators. In Malaysia, more indicators of infrastructure support were rated "Medium". Similar results were also noted in Ghana and Kenya (22, 23).

These different results show that different governments are at different levels of development of healthy food environment policies and infrastructure support and really have gaps, especially in the implementation of political priorities linked to food environment challenges.

Across the five countries in West Africa, experts recommended firstly to governments to implement/strengthen the school feeding policies/program. Such a program is essential to promote the acquisition of healthy eating habits and the promotion of healthy eating among children by increasing the consumption of fruits and vegetables and reducing that of ultra-processed foods and nutrients of concerns (37). Experts also considered this action to have positive impact on gender and sustainability. This integrated approach proposed by stakeholders aligns with the results of evidence which considers that school feeding policies combining several components and strategies in the promotion of a healthy diet promote better results among children (38). In another recent study, experts Ireland, Germany, Norway, Poland, Slovenia, Italy and Portugal also recommended that governments implement nutritional standards in schools, including provision of healthy school meals and food (35). This also aligns with the WHO vision for healthy food provision policies in schools and food purchasing and services for healthy eating (39); and the 19th recommendation of the Second International Conference on Nutrition (ICN2) of 2014 on national guidelines and coherent policies on food and diets (40).

During the dissemination workshops, public policies aimed at reducing the impact of unhealthy food promotion among children emerged as a key political priority across all five countries. Stakeholders strongly recommended that governments adopt specific regulatory measures to limit the advertising and marketing of unhealthy foods targeted at children, particularly through television, digital media, and school settings. These recommendations are also aligned with the 2023 World Health Organization (WHO) guidelines, which emphasize the urgent need to protect children from the harmful effects of exposure to ultra-processed food marketing. The WHO calls on member states to implement comprehensive, mandatory policies to restrict the marketing of foods high in sugar, salt, and unhealthy fats, recognizing the critical role such policies play in preventing childhood obesity and noncommunicable diseases. The alignment between national workshop recommendations and global policy guidance highlights a strong foundation for coordinated regional and international action to create healthier food environments for children in West Africa (41). Elsewhere, these public health concerns have already been considered by other governments such as Quebec in Canada and Malaysia (36).

Dietary guidelines are programmatic and policy tools capable of shaping food environments by facilitating the establishment of nutritional standards in public settings such as schools. In addition, they are also tools that promote the orientation of sectoral policies to improve food security and the nutritional and health status of populations (42). In this present study, Burkinabe, Senegalese and Togolese stakeholders recommended to their governments to develop national dietary recommendations and a food guide based on the results of national food consumption surveys. Indeed, representative national surveys were also recommended by WHO to monitor nutritional and health status to ensure regular monitoring of the impact of policies on the health and nutrition of populations and to identify political priorities and nutrition-related inequalities (39, 43). National surveys also generate essential data to support food environment monitoring systems, which are recommended by INFORMAS and the Second International Conference on Nutrition (ICN2) to inform and guide policy decisions (28, 38). In Benin, stakeholders identified this as a policy priority and recommended that the government establish a national food environment surveillance system. This system should place particular emphasis on food composition and nutrients of concern, promotion of child nutrition, and nutritional quality of food served in schools and other public sector institutions These priority actions common or complementary to the different countries according to the priority domains could be subject to monitoring at the regional level to further generate scientific data to support policy makers in policy development and implementation.

Strengths and limitations

One of the key benefit of this study was the capacity strengthening of national research teams and the two-tier coordination of the regional project, which played a crucial role in consolidating data for comparative analysis. At the national level, the project was led by country-specific technical coordination teams working in close collaboration with national multisectoral nutrition platforms. This approach facilitated institutional support, improved stakeholder mobilization, and ensured that the process was rooted in national contexts. Furthermore, the most important element for mobilizing actors in multisectoral nutrition platforms was the political involvement of national government actors and the strengthening of their capacities. This opportunity could promote the appropriation of results and changes in political priorities and practices in nutrition. At the regional level, coordination efforts remained focused on delivering project outcomes despite significant health and political challenges, particularly those arising from the COVID-19 pandemic. This resilience and adaptability were critical to the success of the project. A cornerstone of the implementation process was the development and validation of evidence documents during workshops involving key government stakeholders. These documents now serve as strategic policy tools, helping government entities identify policy gaps, improve coherence, and inform future planning. In addition, the introduction of two new criteria addressing gender and sustainability during the action identification and prioritization phase represented a notable innovation. This advancement enhanced the policy relevance and inclusivity of the research. Finally, the integration of 12 new indicators into the Food-EPI framework focused on the double burden of malnutrition demonstrated the adaptability and dynamism of the tool. This adjustment directly responded to the recommendation of Senegalese stakeholders, who emphasized the need to tailor the tool to better reflect the prevalence of undernutrition in national contexts (21).

The different steps of the Food-EPI process were similar in all countries which is crucial for enabling meaningful comparisons of the results. The process and dissemination of Food-EPI findings provided valuable opportunities for stakeholders to engage in common research interests priority. However, our research project has some limitations. Indeed, the use of different methods for the analysis of inter-rater reliability may have affected the comparability of results between countries. Additionally, the extent of stakeholder representation in the process varies between countries, particularly regarding the strong presence of government stockholder’s who assessed their own policies in

xx. This may potentially limit the comparability of outcomes across contexts as stakeholders could have been more critical than others.

Recommendations and perspectives

In view of the results linked to the worrying prevalence of the double burden of malnutrition in the five participating countries, the finding of this study and the recommendations of stakeholders must be considered as important tools aimed at developing and monitoring coherent and double-duty food and nutrition policies to improve food environments. To achieve this, four (4) important priorities must be implemented through the Research Network on Public Policies and Food Systems in West Africa (REPSAO): i) use the national multisectorial nutrition as a privileged framework for dialogue for the adoption and dissemination of the recommended actions to sectors and political decision-makers in order to establish political accountability in support for policy change and infrastructure support to improve food environments; ii) maintain the momentum of REPSAO's work in the sub-region to promote the production and utilization of evidences in the development and implementation of coherent and double-duty nutrition policies and actions in West Africa; iii) Implement priority actions common to all five countries in order to provide governments with additional evidence and to better understand and define appropriate, integrated strategies for strengthening school feeding policies. and iv) use the Food-EPI findings from the five countries as a baseline data to establish a regional food environments monitoring system of the priority actions in the next five years.

Conclusion

This project has mobilized and involved multidisciplinary and multisectoral stakeholders and strengthened their capacities in evaluating food environment policies. It also highlighted the importance of adapting monitoring and evaluation tools to country's needs and priorities. This project provided an overview of existing priorities and direction of regional nutrition policies and to establish an agenda of priority policy actions sensitive to gender and sustainability to fill gaps and strengthen nutrition policies aimed at reducing the triple burden of malnutrition in West Africa, and especially children. Indeed, food provision policies were identified in all five countries as a top priority aimed at strengthening school food policy through the implementation of an integrated school feeding program combining several strategies to promote the acquisition of healthy eating habits among children. Finally, proposed priority actions emphasize the need for legislation limiting unhealthy food marketing to children and the development of national dietary recommendations.

This study also revealed three key observations that warrant further investigation. First, the level of implementation of public policies regarding healthy food environments was globally low across all five countries. Secondly public policy priorities in these countries were more focused on reducing undernutrition than overnutrition. Finally, some countries, such as Burkina Faso and Ivory Coast, showed better implementation results than other countries. Future studies should focus on understanding the contextual and structural factors related to the development of public policies that could explain these different stages of policy implementation identified in this study.

Declarations

Ethics approval and consent to participate

The research project was approved in each country by the national ethical committee and in addition examined and approved by the Committee for Ethics in Research in Science and Health (CERSES) of the University of Montreal under number 2023-4277 (cf. supplementary material). All participants received invitation letters and an information and consent form before participating in the research activities. Furthermore, this study took into account the general

principles of Helsinki to promote and ensure respect for all participants and protect their interests, health and rights. Finally, data confidentiality was ensured by the principal investigator who worked on this study with a team of highly qualified researchers.

Consent for publication

Not applicable.

Availability of data and materials

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author

Competing interest

No conflicts of interests were declared by the authors

Funding

The regional project was funded by the International Development Research Center (IDRC), grant number 109416-001. But the study funder had no role in the study design, data collection, data analysis, data interpretation, or writing of this article

Authors' contributions

JSM: Investigation, Supervision, Data curation, Formal analysis, Writing – original draft, Writing – review & editing. AD: Investigation, Supervision, Regional Project administration, Writing – review & editing. ND: Project administration,– review & editing. SV: Investigation, Supervision, Writing – review & editing. CS: Investigation, Supervision, Local Project administration, – review & editing. ZAN: Investigation, Supervision, Local Project administration, – review & editing. ARRA: Investigation, Supervision, Local Project administration, – review & editing. ST: Investigation, Supervision, Local Project administration, – review & editing. SKA: Investigation, Supervision, Local Project administration, – review & editing. JCM: Investigation, Supervision, Project administration, Writing – review & editing.

Acknowledgments

The implementation of the regional research project was the result of fruitful collaboration between the regional technical coordination and the country research teams. The project was coordinated by the Laboratory for Research in Nutrition and Human Food, University Cheikh Anta Diop of Dakar (UCAD) in collaboration with the nutrition department of the University of Montreal and the Institute Sciensano of Belgium. In addition, the country research teams had also established dynamic collaboration with multi-sectoral and multidisciplinary nutrition platforms to facilitate project implementation and to access to data. These were: i) Laboratory for Research in Nutrition and Human Food-UCAD in collaboration with the Ministry of Health and Social Action and the Cell for the Fight against Malnutrition in Senegal (CNDN), ii) Félix Houphouët Boigny University in collaboration with the National Council for Nutrition, Food and Early Childhood Development (CONNAPE), in Ivory Coast ; iii) the Regional Institute of Public Health – Ouidah (IRSP) in collaboration with the Food and Nutrition Council of Benin; iv) the University of Kara and Lomé in collaboration with the Ministry of Higher Education and Research and the Division of Nutrition in Togo, v) the Health Sciences Research Institute in collaboration with the Joseph Ki-Zerbo University and the Technical Secretariat

responsible for improving food and nutrition in Burkina Faso (ST-NUT). We would like to thank all these institutions and the experts who participated in the various project activities.

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Tables

Table 1: National panel of experts who evaluated policies, proposed and prioritized actions in five countries of West Africa

Evaluation Workshop	**BN**	**BKF**	**CI**	**SN**	**TG**	**Regional**
	n (%)	**n (%)**	**n (%)**	**n (%)**	**n (%)**	**n (%)**
Targeted experts panel	48	61	62	61	52	284
Participation rate	43 (89.6)	39 (63.9)	55 (88.7)	31(50.8)	46 (88.5)	214 (75.4)
Government sectors	21 (48.8)	25 (64.1)	26 (47.3)	16 (51.6)	22 (47.8)	110 (51.4)
Universities and research institutes	19 (44.8)	9 (23.1)	17 (30.9)	10 (32.2)	13 (28.3)	68 (31.8)
Organizations and civil society	03 (6.9)	5 (12.8)	12 (21.8)	5 (16.1)	11 (23.9)	36 (16.8)
Men	29 (67.4)	26 (66.7)	40 (72.7)	17 (54.8)	33 (71.7)	145 (67.8)
Women	14 (32.6)	13 (33.3)	15 (27.3)	14 (45.2)	13 (28.3)	69 (32.2)
Identification and prioritization of actions	**BN**	**BKF**	**CI**	**SN**	**TG**	**Regional**
	n (%)	**n (%)**	**n (%)**	**n (%)**	**n (%)**	**n (%)**
Targeted experts panel	48	56	62	50	52	268
Participation rate	40 (80)	40 (71.4)	49 (79)	30 (60)	41 (78.8)	200 (74.6)
Government sectors	19 (47.5)	23 (57.5)	24 (49)	18 (60)	17 (41.5)	101 (50.5)
Universities and research institutes	18 (45)	13 (32.5)	15 (30.6)	8 (26.7)	16 (39)	70 (35)
Organizations civil society	03 (7.5)	4 (10)	10 (20.4)	4 (13.3)	8 (19.5)	29 (14.5)
Men	26 (65)	29 (72.5)	33 (67.3)	12 (40)	28 (68.3)	128 (64)
Women	14 (35)	11 (27.5)	16 (32.7)	18 (60)	13 (31.7)	72. (36)

Pays	COMP	LABEL	PROMO	PRIX	PROV	RETAIL	TRADE	LEAD	GOVER	MONIT	FUND	PLATF	HIAP
BN													
BKF													
CI													
SN													
TG													

Table 2a: Level of domains implementation with indicators (**n = 47**)

PAYS	COMP	PROMO	PROV	RETAIL	LEAD	MONIT
BN						
BKF						
CI						
TG						

Table 2b: Level of domains implementation with 12 new indicators

Table 2: **Level of Policy and infrastructure support implementation** compared to international good practices for the Food **in the five countries**
Dark red (very low 0 ≤ 25); Red (low 26 ≤ 50%) ; Green (medium 51 ≤ 75%); Dark green (high > 75%),

Table 3: Level of implementation of the 12 new indicators by country

	BN (%)	BKF (%)	CI (%)	TG (%)	Régional (%)
Policy component					
COMP 3: National fortification policies	55	69	66	43	58
PROMO 4: Breast milk Substitute Marketing Restriction Policies	34	62	52	29	44
PROV 5: Policies and/or regulations Breastfeeding/ Workplace and public places	40	46	44	36	41
PROV 6: National policies to promote WASH access	66	63	64	59	63
RETAIL 5: Incentives and regulation/informal sector/healthy food environments	25	53	38	39	39
Infrastructure support component					
LEAD 6: Breastfeeding policies	68	68	74	60	68
LEAD 7: Complementary feeding policies	64	55	70	53	61
LEAD 8: Objectives exclusive breastfeeding and complementary feeding defined	68	75	72	61	69
LEAD 9: Strong and visible political support/undernourishment	71	78	68	55	68
MONIT 7: Regular monitoring indicators exclusive breastfeeding and complementary feeding	65	73	62	50	63
MONIT 8: Growth promotion surveillance program including childhood obesity	57	76	58	49	60
MONIT 9: Objectifs et normes pour SSA définis et suivis	62	54	44	40	50
Overall score of implementation of the 12 indicators	56	64	59	48	57

Table 4: Recommended common or complementary priority actions

Priority Domain	Priority actions recommended to governments	Country
Food provision	1. Implementation of an integrated school feeding program combining: i) institutional food supply from local producers; ii) development of menus and nutritional standards based on local foods and nutritional education; and iii) technical and financial institutional support	All countries
	2. Evaluation of the quality of food service provision in public structures (school canteens; military services, prison services, university services, hospitals, etc.) to promote the choice of healthy foods in Benin	Benin
	3. The development and implementation of nutritional standards for meals offered at the food service level (universities, hospitals, prisons, etc.) in Senegal.	Senegal
	4. The finalization and adoption of the national healthy and balanced diet policy in school, extra-curricular and university environments in Togo	Togo
Food promotion	5. Evaluation of the level of exposure of children to advertising of unhealthy foods through broadcast media in Benin and Senegal	Benin Senegal
	6. The development of regulatory texts prohibiting the advertising of unhealthy foods in the living environment of children (school, sports field, playground, etc.) in Burkina Faso.	Burkina Faso
	7. The development of a decree clearly defining authorized (healthy) and unauthorized (unhealthy) foods for advertising to children in Togo	Togo
	8. The adoption of a law for food in schools and preschools and to make functional the National Committee for the promotion, protection, support for breastfeeding and early childhood development in Ivory Coast.	Ivory Coast
	9. The development and adoption of the text relating to breast milk substitutes in Togo.	Togo
	10. The integration of the choice of healthy foods into the training program for children of preschool in Benin	Benin
Food composition	11. The development of a complete food composition table in Senegal and Togo	Senegal Togo
	12. The development of a national standards document on nutrients of concern in foods in Benin	Benin
	13. The definition of a model of good practices and nutritional standards by focusing on the content of nutrients of concern in foods offered in fast food establishments in Senegal	
	14. Training and raising awareness of catering stakeholders in good culinary and nutritional practices in Ivory Coast	Senegal
	15. Making food standards mandatory, including infant flour, and adopting a monitoring plan for food fortification programmes, including infant flour, in Burkina Faso.	Ivory Coast

		Burkina Faso
Leadership	16. Development of national dietary recommendations and the food guide based on the results of national food consumption surveys in Burkina Faso, Senegal and Togo	Burkina Faso Senegal Togo
	17. Strengthening nutrition financing by advocating for the adoption of a budget line allocated: a) to fight against diet-related non-communicable diseases in Benin; b) for nutrition in Burkina Faso; and c) for the purchase of iron, folic acid and calcium for the supplementation of pregnant women in Togo	Benin Burkina Faso Togo
Monitoring and Evaluation	18. Carrying out a national food consumption survey to guide the definition of specific objectives relating to nutrients of concern and the orientation of food and nutritional policies in Benin and Senegal	Benin Senegal
	19. Establishment of a food environment monitoring system focusing on a) food composition and nutrients of concern; and b) the promotion of children's nutrition and the nutritional quality of foods in the food services of public establishments (schools and others) in Benin. 20. Evaluation of the existing monitoring and evaluation system for school canteens and other food services to strengthen them in Senegal 21. Regular assessment of the quality of food served in canteens and restaurants in Burkina Faso. 22. Establishment of a budget line for monitoring the nutritional status of the population (obesity, deficiencies, etc.) in Togo	Benin Senegal Burkina Faso Togo
	23. Development of a food safety policy and the development and implementation of a food safety monitoring plan in Ivory Coast 24. Development regulatory text on Food Safety in Burkina Faso.	Ivory Coast Burkina Faso

Figures

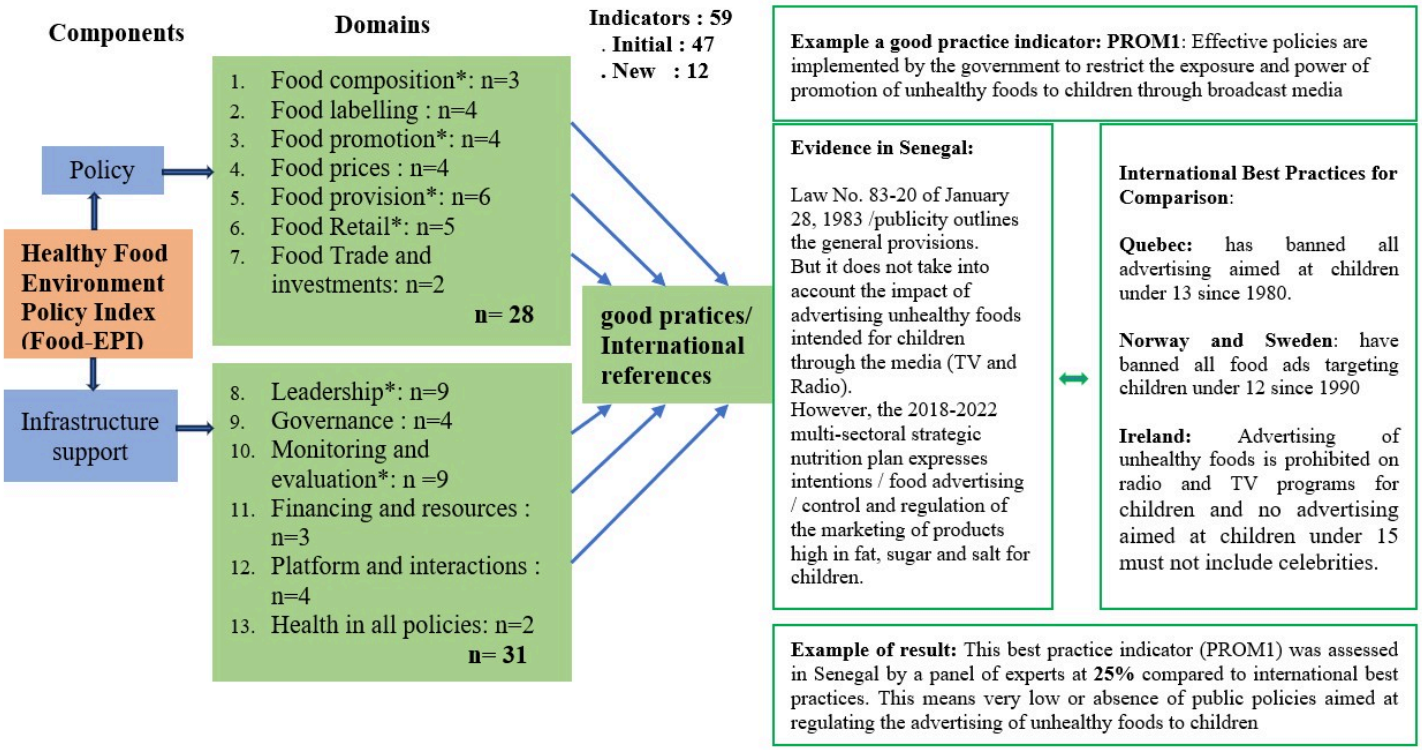


Figure 1

Components, domains and indicators (n=59) of the healthy food environment policy index (Food=EPI) used in the five countries with an example of evidence of implementation in Senegal and international best practices of comparison.

(*): indicate the domains that contain the new indicators. Five indicators are in the policy component and seven in the infrastructure support component

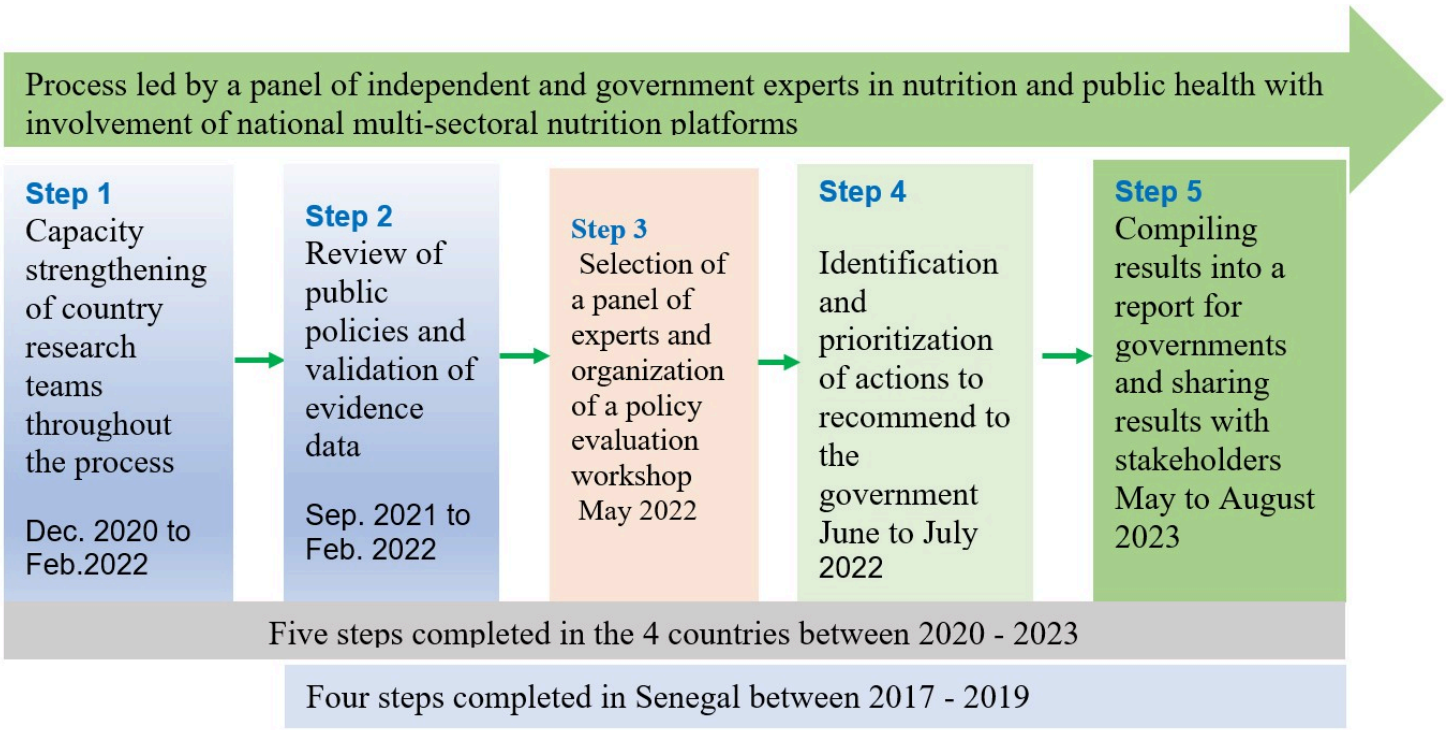


Figure 2

Process of evaluating the level of implementation of government policies on food environments based on international best practices using the Healthy Food Environment Policy Index (Food-EPI) in five countries in West Africa, translated from (28).

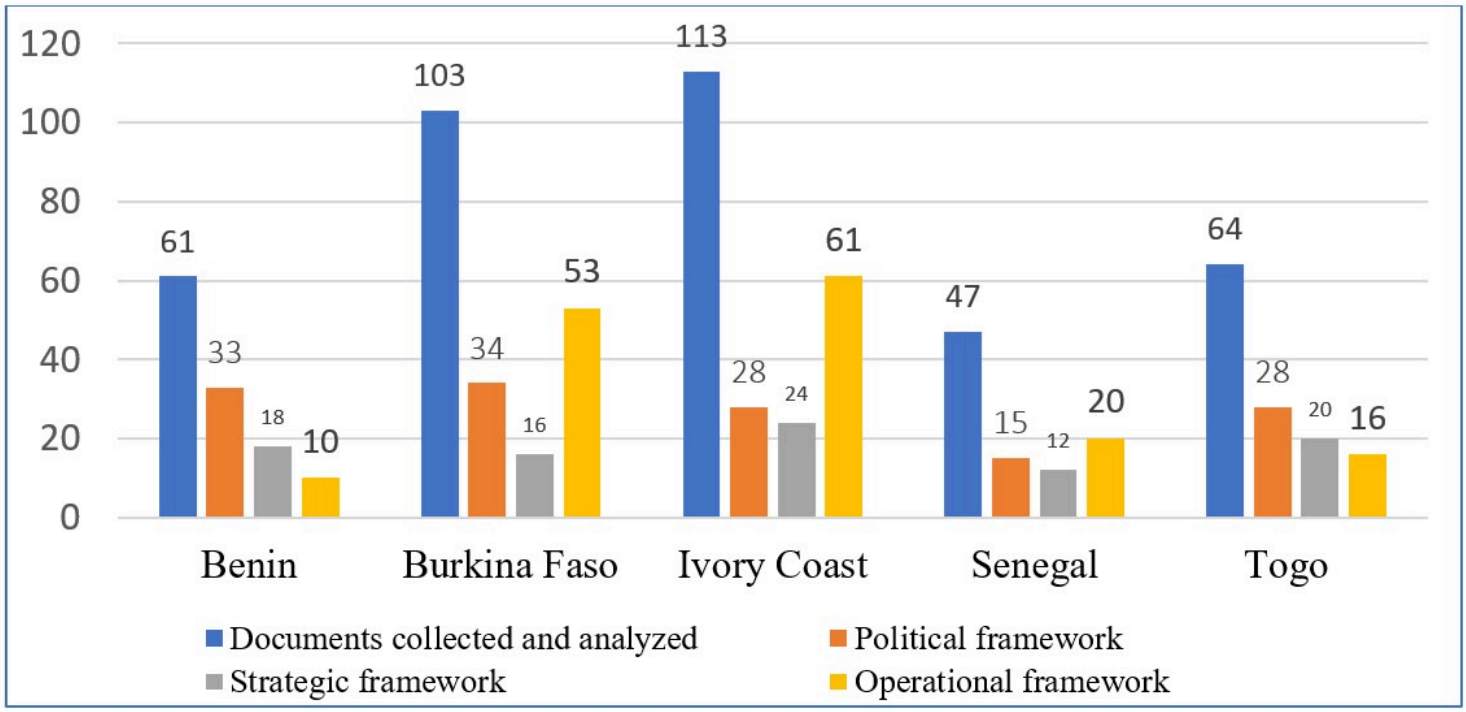


Figure 3

Distribution of documents collected according to the framework and country

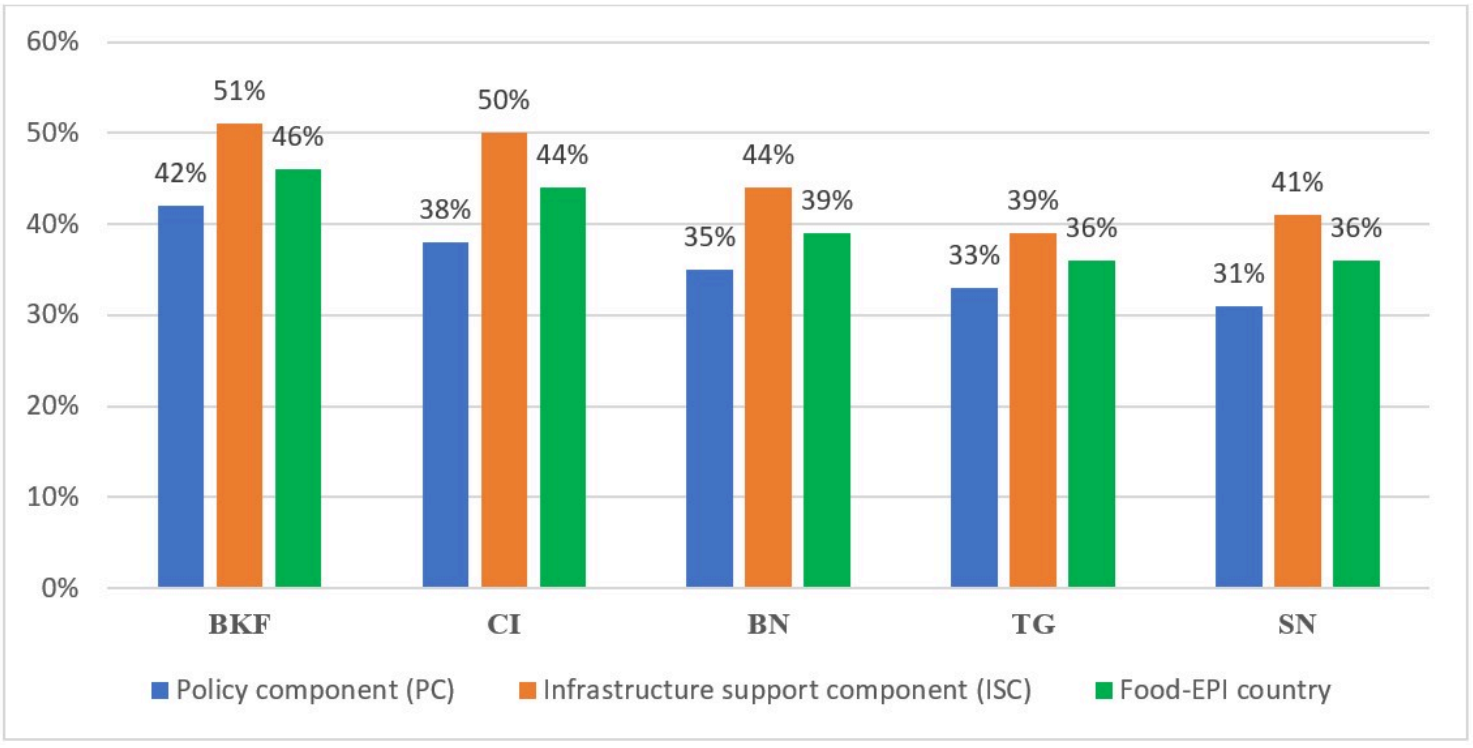


Figure 4

Level of implementation of overall Food-EPI and according to the policy and infrastructure support component in the five countries

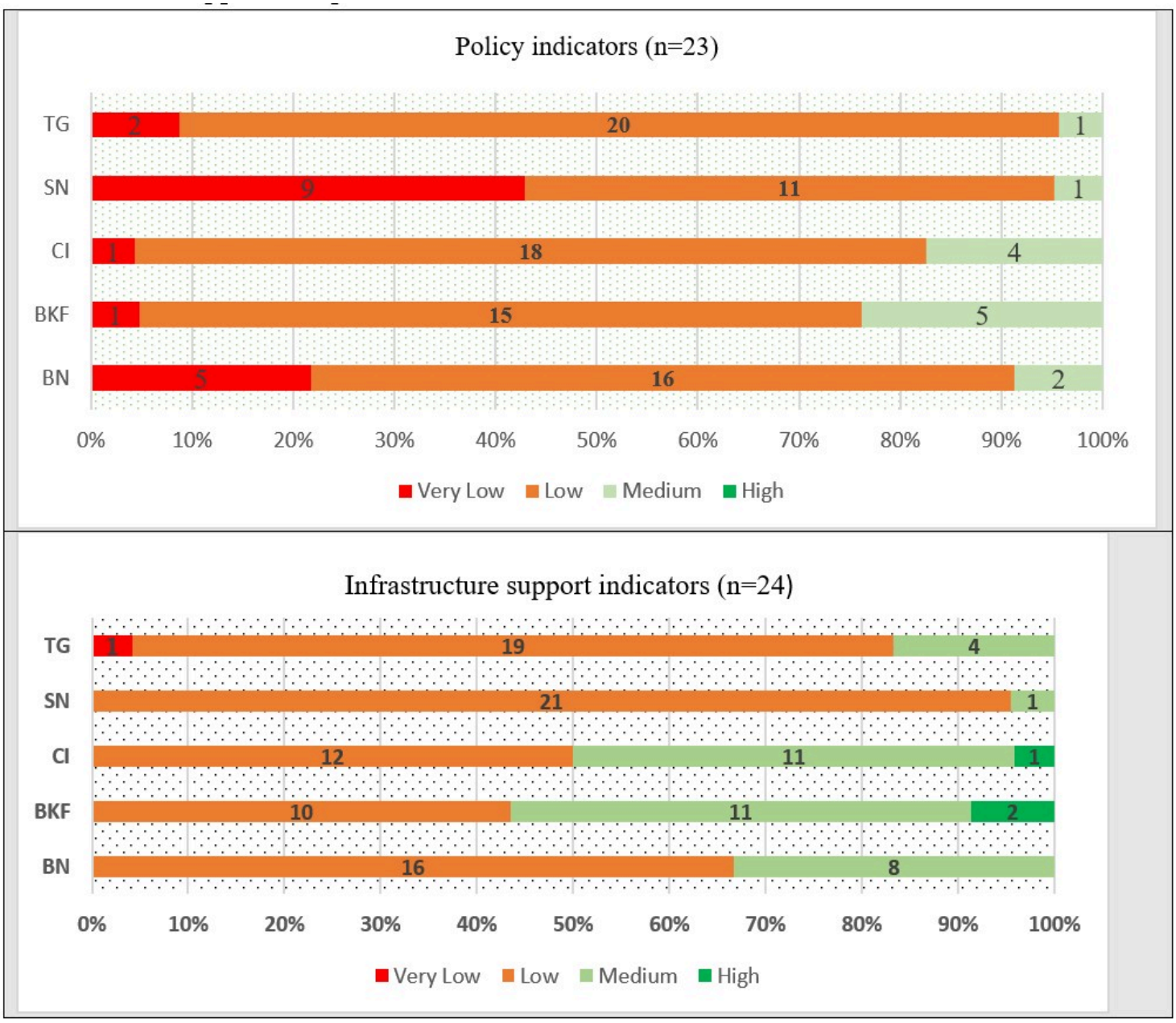


Figure 5

Proportion of policy indicators (a) and infrastructure support (b) with “very low”, “low”, “medium” or “high” implementation in each country compared to international best practices (n=47).

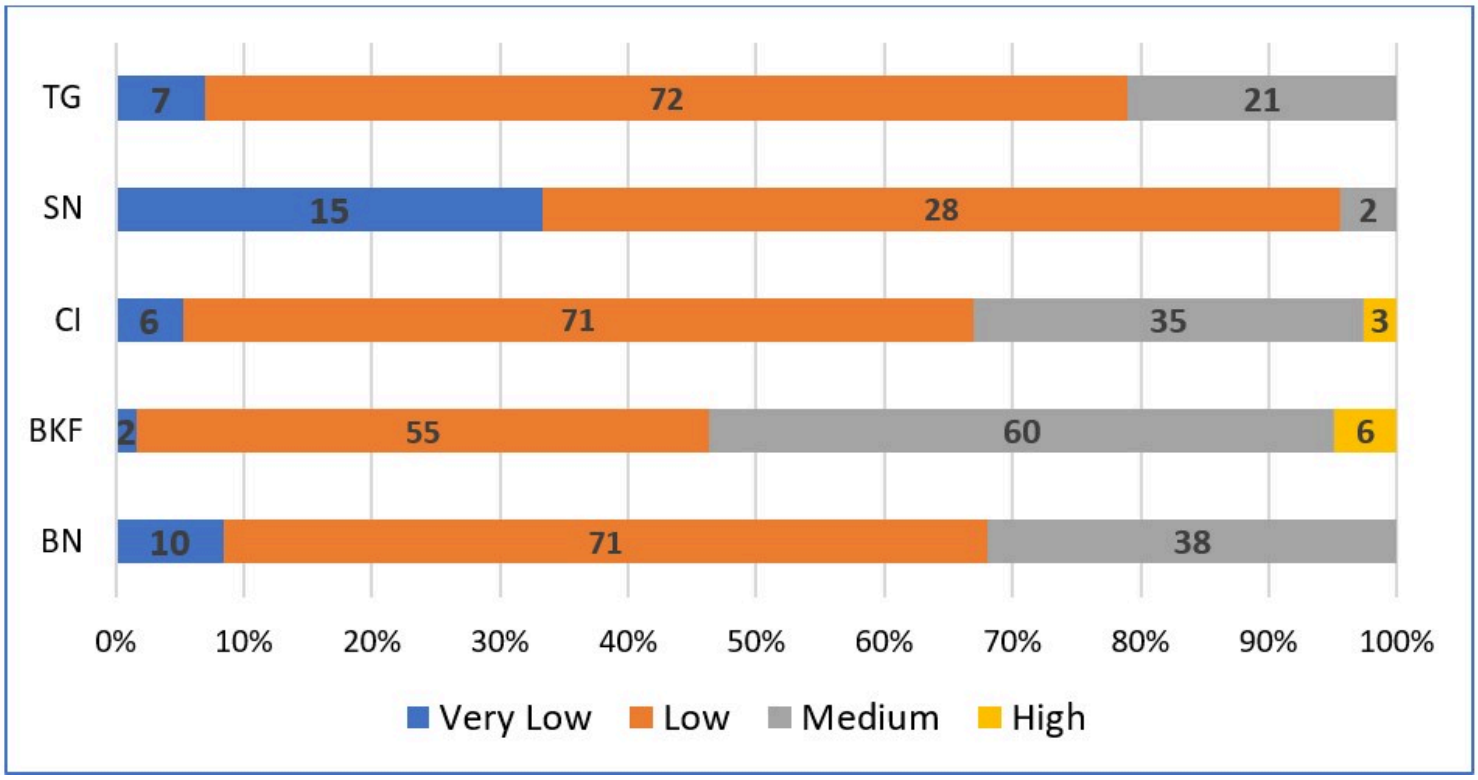


Figure 6

Proportion of priority actions linked to indicators of the policy component and infrastructure support with “Very low or non-existent”, “low”, “medium” and “high” implementation.

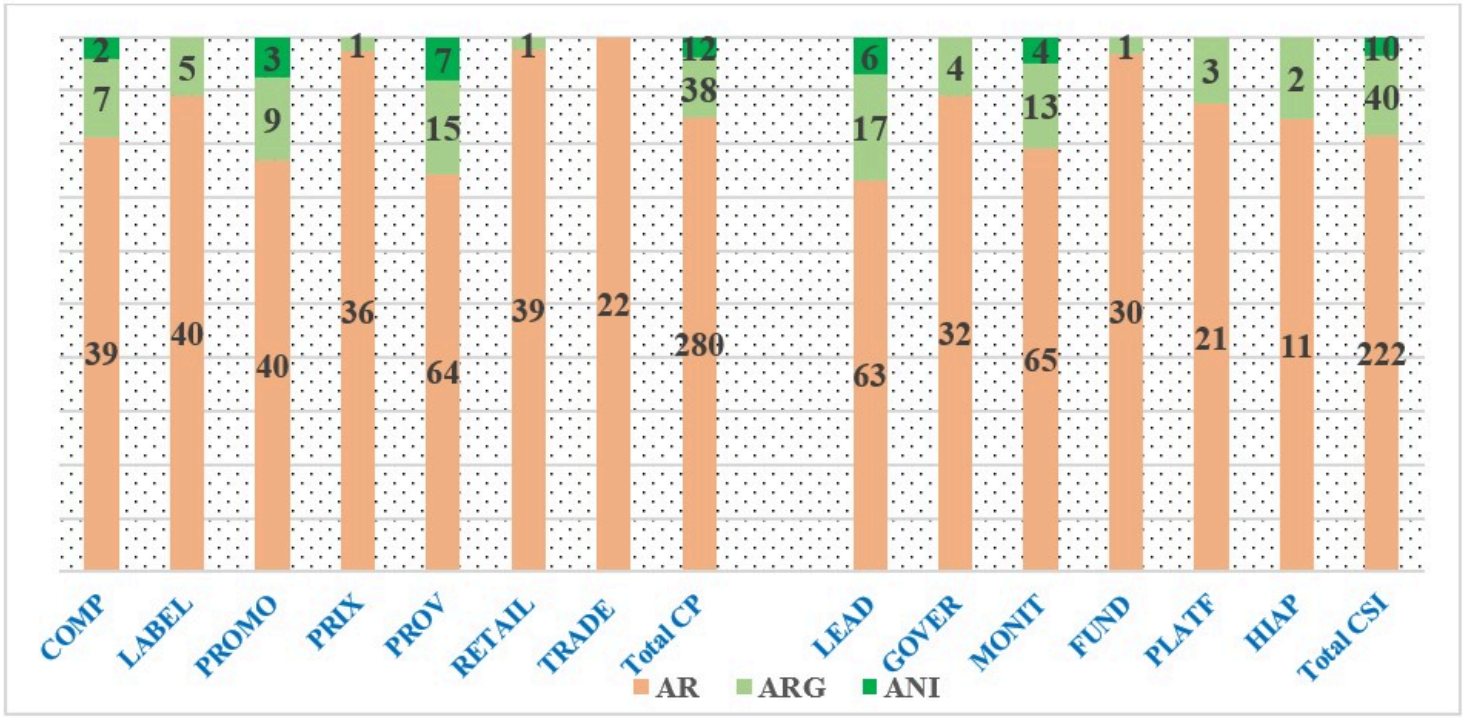


Figure 7

Policy and infrastructure support actions recommended to governments (ARG) including those linked to new indicators (ANI) as a proportion of the total number of actions retained (AR) in all five countries.

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- 3.Supplementarymaterial3Tenpriorityactionscomponentandcountry.docx
- 2.Supplementarymaterial2Exampleofbestpratcies.docx
- 1.supplementarymaterial1Criteriaofprioritising.docx