ACTIO: Docência em Ciências
ISSN: 2525-8923

http://periodicos.utfpr.edu.br/actio

Between science, health, and food: an analysis of how the principles of food and nutrition education are applied in the trai-ning of biology teachers at the state universi-ties of Bahia

Adriane Lizbehd Halmann
alhalmann@uesc.br
orcid.org/0000-0001-8312-9077
Universidade Estadual de Santa Cruz (UESC), Ilhéus, Bahia, Brasil.

ABSTRACT

This study analyzed the presence and treatment of Food and Nutrition Education (FNE) in the curricula of undergraduate Biological Sciences teacher education programs at the State Universities of Bahia (UEBAs), aiming to assess the coherence between the principles and guidelines of the Reference Framework for Food and Nutrition Education in Public Policies and the formative orientations expressed in curricular documents. The research adopted a qualitative, documentary, and exploratory approach, involving the analysis of Course Pedagogical Projects (PPCs), curricular matrices, syllabi, and course flowcharts from eleven programs offered by UNEB, UEFS, UESC, and UESB, available on institutional websites. The analysis was guided by an analytical framework based on the organizational principles of FNE, covering dimensions such as sustainability, food culture, intersectoriality, and the promotion of autonomy. The results revealed the absence of mandatory courses and the sporadic and fragmented inclusion of FNE within the programs, with a predominance of biologicist approaches disconnected from the sociocultural, political, and environmental dimensions of food. This formative gap compromises the preparation of teachers to work critically with the topic in basic education and to promote the Human Right to Adequate Food. It is concluded that, although the Biological Sciences degree programs have great formative potential for FNE, curricular review and stronger articulation between teacher education policies and food and nutrition security policies are necessary.

KEYWORDS: Food and nutrition education; Teacher education; Biological sciences degree; Curriculum; Health education.

Entre ciência, saúde e alimentação: análise da aplicação dos princípios da educação alimentar e nutricional na formação de professores de ciências biológicas nas universidades estaduais da Bahia

RESUMO

O estudo analisou a presença e o tratamento da Educação Alimentar e Nutricional (EAN) nos currículos dos cursos presenciais de Licenciatura em Ciências Biológicas das universidades estaduais da Bahia (UEBA), buscando compreender a coerência entre os princípios e diretrizes do Marco de Referência de Educação Alimentar e Nutricional para as Políticas Públicas e as orientações formativas expressas nos documentos curriculares. A pesquisa, de abordagem qualitativa, caráter documental e natureza exploratória, envolveu a análise dos Projetos Pedagógicos de Curso (PPCs), matrizes curriculares, ementários e fluxogramas de onze cursos ofertados pela UNEB, UEFS, UESC e UESB, disponíveis nos sites institucionais. A análise foi orientada por um roteiro construído com base nos princípios organizativos da EAN, abrangendo eixos como sustentabilidade, cultura alimentar, intersetorialidade e promoção da autonomia. Os resultados evidenciaram a ausência de disciplinas obrigatórias e a presença pontual e fragmentada da EAN nas licenciaturas, predominando abordagens biologicistas e desarticuladas das dimensões socioculturais, políticas e ambientais da alimentação. Essa lacuna formativa compromete a formação de professores capazes de atuar criticamente com o tema na educação básica e de promover o Direito Humano à Alimentação Adequada. Conclui-se que, embora os cursos de Ciências Biológicas apresentem elevado potencial formativo para a EAN, há necessidade de revisão curricular e de maior integração entre as políticas de formação docente e as políticas públicas de segurança alimentar e nutricional.

PALAVRAS-CHAVE: Educação alimentar e nutricional; Formação de professores; Licenciatura em Ciências Biológicas; Currículo; Educação em saúde.

FOOD AND NUTRITION EDUCATION AND ITS INTEGRATION INTO BASIC EDUCATION AND TEACHER EDUCATION CURRICULA

The social, economic, and environmental shifts of recent decades have profoundly reshaped how people live, what they consume, and how they relate to food. The advance of industrialization and the globalization of the food system have driven the homogenization of diets, a sharp rise in ultra-processed food consumption, and the erosion of cultural references tied to eating. In parallel, problems such as food and nutrition insecurity, the resurgence of hunger, and the rise of chronic non-communicable diseases (NCDs) have worsened — all symptoms of an unsustainable and unequal development model. These challenges place Food and Nutrition Education (FNE) at the heart of debates about health, citizenship, and sustainability, establishing it as essential dimension of human formation.

The Reference Framework for Food and Nutrition Education in Public Policies defines FNE as a field of knowledge and as a continuous, lifelong, transdisciplinary practice grounded in the Human Right to Adequate Food (DHAA) and Food and Nutrition Security (SAN) (Brasil, 2012a; 2006). Within this framework, FNE aims to promote dietary practices that are healthy, culturally meaningful, and environmentally sustainable, guided by autonomy, critical reflection, and respect for diverse forms of knowledge and contexts (Brasil, 2018). To this end, the Framework lays out a set of principles to guide practice across different settings. Among these, the school stands out as a prime setting for shaping critical citizens and plays a strategic role in this process, with FNE serving as a cross-cutting theme to be embedded in basic education curricula, as set forth in national policies and regulations.

However, although legislation requires FNE to be addressed as a mandatory cross-cutting theme in basic education, the National Curriculum Guidelines for Basic Education Teacher Education do not establish it as a required component in initial teacher training (Brasil, 2018; 2019; 2024). This gap between what is mandated for basic education and what is built into teacher-training programs reveals a clear disconnect between education policy and food and nutrition security policy. The absence of specific guidelines for FNE in initial teacher training tends to produce curricula that treat the topic in a fragmented or sporadic way — or omit it altogether — making it difficult to develop the pedagogical skills needed for a critical, interdisciplinary approach.

Previous studies have indicated that part of the difficulty in implementing FNE in school curricula may stem from teacher training itself. Weirich and Meti (2022), in their analysis of FNE implementation in the schools of a Brazilian state capital, found that most of the teachers in their sample had not encountered the topic during their initial training, nor had they taken any continuing-education courses that addressed it. This finding helps explain what other studies mapping FNE activities in Brazilian schools have reported: many of these activities are not the product of planned, systematic teaching but rather isolated interventions led by professionals from other fields, often disconnected from the school's political-pedagogical project (Halmann & Oliveira, 2023; Halmann, 2024). This points to weaknesses in teacher training around the theoretical, methodological, and ethi-

cal foundations of FNE. Closing this gap requires understanding how teaching-degree programs have — or have not — incorporated FNE into their curricular structures and training practices.

Against this backdrop, examining the presence and treatment of FNE in initial teacher training is a critical step toward understanding the conditions for its effective implementation in schools. The Biological Sciences teacher education program is a particularly relevant context for such an analysis because it brings together knowledge of the human body, health, the environment, food production, and pedagogical practice — all dimensions intrinsically linked to FNE and sustainability.

When discussing food-related issues, it is important to underscore that they involve both individual and collective determinants — particularly economic, social, and cultural factors (Brasil, 2012, p. 14). This means that any consideration of training for Food and Nutrition Education must take local contextual factors into account. In Brazil's Northeast region, and Bahia in particular, we find a territory historically shaped by regional inequalities and by the coexistence of varied socioeconomic realities — from the semi-arid backlands to the cocoa-growing belt, from the coastline to the cerrado and caatinga biomes. Bahia embodies, within its territory, the many challenges and possibilities tied to food, food production, and health promotion (Moura, 2025).

In Bahia, food is shaped by deep cultural dimensions — reflected in the diversity of traditional knowledge, in agroecological practices, and in local food systems — but also by persistent vulnerabilities such as food insecurity, the precarization of agricultural labor, and the environmental degradation tied to unsustainable production models. From this perspective, training Biological Sciences teachers who can critically understand these dynamics is essential for strengthening educational practices committed to food sovereignty and to the food and nutrition security of these specific communities.

Bahia has a network of state universities (UEBAs) made up of the Universidade do Estado da Bahia (UNEB), the Universidade Estadual de Feira de Santana (UEFS), the Universidade Estadual de Santa Cruz (UESC), and the Universidade Estadual do Sudoeste da Bahia (UESB). These institutions play a strategic role, given their broad territorial reach and longstanding commitment to training basic education teachers. Examining their programs across different regions of the state offers insight into how public policies on teacher education engage with local specificities, contributing to regional development and to building pedagogical practices grounded in context. Looking at this set of UEBAs makes it possible to observe a range of institutional configurations: number of campuses, geographic reach, and student and faculty profiles.

UNEB is Bahia's largest state public university. Founded in 1983, it has a multi-campus structure with a presence in nearly every region of the state. It enrolls 26,931 undergraduate students and 5,331 graduate students, with about 2,181 faculty members and 1,656 technical staff spread across 26 campuses and 31 departments offering 46 on-campus undergraduate programs and many distance-learning options. UEFS is characterized as a large university, with more than 10,000 enrolled students and nearly 1,000 tenured faculty. This institutional profile points to both challenges and opportunities, particularly with regard to

course offerings, infrastructure, and the integration of teaching, research, and outreach. UESB, with its three campuses (Itapetinga, Jequié, and Vitória da Conquista), offers 47 undergraduate programs and began the second academic term of 2025 with more than 8,000 undergraduates enrolled across these campuses. UESC operates from a single campus in Ilhéus and is a major hub on Bahia's southern coast, shaped by cultural, environmental, and socioeconomic contexts that differ from those of the inland universities.

Given this context, the present study set out to examine the presence and treatment of Food and Nutrition Education in the curricula of the on-campus undergraduate teaching programs in Biological Sciences offered by Bahia's state universities (UEBAs). More specifically, the study aimed to: identify how FNE is mentioned and addressed in the Pedagogical Course Projects (PPCs), curricular matrices, and syllabi of the Biological Sciences teaching programs at the UEBAs; assess the coherence between the principles and guidelines of FNE — as set out in the Reference Framework for Food and Nutrition Education in Public Policies — and the formative guidance found in these programs' curricular documents; and evaluate the strengths and gaps in initial teacher training with respect to incorporating FNE as a pedagogical practice aimed at fostering autonomy, citizenship, and sustainability.

METHODOLOGY

This study is situated within the field of teacher-education research and focuses on examining the presence and treatment of Food and Nutrition Education (FNE) in the curricula of Biological Sciences teaching degrees at Bahia's state universities (UEBAs). It starts from the premise that, as set out in the Reference Framework for Food and Nutrition Education in Public Policies, FNE is a field of knowledge and a continuous, lifelong, transdisciplinary, and intersectoral practice aimed at fostering autonomous and voluntary healthy eating habits as part of realizing the Human Right to Adequate Food and Food and Nutrition Security. From this standpoint, teacher education is understood as a strategic space for grounding these principles in basic education.

The research uses a qualitative, documentary, and exploratory approach, aiming to identify and analyze how FNE is embedded in the programs' pedagogical projects and what strengths and gaps emerge in initial teacher training. As Lüdke and André (1986) note, documentary research allows for the examination of records and documents in order to understand the structural, ideological, and organizational dimensions of training processes without direct researcher intervention in the object of study.

We analyzed the curricula of the on-campus Biological Sciences teaching degrees offered by Bahia's four state universities: Universidade do Estado da Bahia (UNEB), Universidade Estadual de Feira de Santana (UEFS), Universidade Estadual de Santa Cruz (UESC), and Universidade Estadual do Sudoeste da Bahia (UESB).

First, we searched the institutions' official websites to identify which campuses offered Biological Sciences teaching degrees. This search showed that UNEB offered the program at 6 of its 26 campuses — Alagoinhas, Barreiras,

Caetité, Teixeira de Freitas, Senhor do Bonfim, and Paulo Afonso. UESB offered the program at its three campuses: Itapetinga, Jequié, and Vitória da Conquista. UEFS (Feira de Santana campus) and UESC (Ilhéus campus) each offered one program, at their single campuses. We then examined the program structures to determine whether any of them were duplicates or genuinely distinct, and concluded there were no duplicates. The full research corpus thus comprised eleven on-campus Biological Sciences teaching degrees offered by the UEBAs.

We then collected the documents describing each program, considering only the information available on each program's official website as of October 2025. The following materials were gathered and analyzed: Pedagogical Course Projects (PPCs), curricular matrices, course syllabi, program flowcharts, and other supplementary information available on institutional web pages.

The collected documents were subjected to qualitative content analysis as set out by Bardin (2016) — understood as a set of systematic techniques for analyzing communications that allow for the interpretation of meanings present in texts and documents. The analysis proceeded in three connected stages: (i) pre-analysis, (ii) exploration of the material, and (iii) treatment and interpretation of the results.

In the pre-analysis stage, we conducted a floating reading of the Pedagogical Course Projects (PPCs), curricular matrices, syllabi, and program flowcharts in order to familiarize ourselves with the material and make a preliminary identification of elements related to Food and Nutrition Education (FNE). This phase also defined the research corpus and organized the documents into an analytical spreadsheet.

During the material-exploration stage, we coded the data using a previously developed analytical framework based on the principles of the Reference Framework for Food and Nutrition Education in Public Policies. The framework included nine areas of observation: (1) general program characterization; (2) inclusion of FNE in the pedagogical project; (3) alignment with the Framework's principles; (4) pedagogical and methodological approaches; (5) curricular components related to FNE; (6) inter- and transdisciplinary integration; (7) outreach, research, and innovation; (8) communication and educational approach; and (9) gaps and strengths. For each area, observation items, evidence types, and space for recording examples were defined as the readings progressed, supporting a systematic, comparative reading across programs. The findings were then grouped into categories established a priori from the organizing principles of the Reference Framework for Food and Nutrition Education in Public Policies (Brasil, 2012):

1. Social, environmental, and economic sustainability;

2. Approach to the food system as a whole;

3. Valuing local food culture and respecting the diversity of views and perspectives, recognizing the legitimacy of different forms of knowledge;

4. Food and meals as reference points;

5. Promotion of self-care and autonomy;

6. Education as an ongoing process that fosters autonomy and the active, informed participation of individuals;

7. Diversity across practice settings;

8. Intersectoral collaboration.

These categories were initially defined deductively (a priori), drawing on the theoretical framework and research goals. However, as the systematic reading of the documents progressed, additional themes emerged, allowing us to refine the categories and develop analytical subcategories. Notable subcategories include: type of approach (biologically reductionist, sociocultural, environmental, or integrated), nature of curricular inclusion (disciplinary, cross-cutting, or absent), and degree of articulation with pedagogical practices and educational contexts. The analysis thus combined deductive and inductive procedures, strengthening the interpretive consistency of the study.

The data were organized in a structured spreadsheet recording document excerpts, identified evidence, and their correspondence with the analytical categories. This procedure made it possible to compare the programs and identify patterns, recurring themes, and gaps in their treatment of FNE.

In the final stage — treatment and interpretation of results — the data were analyzed in light of the theoretical framework, particularly the principles of FNE and the broader debates around teacher education and curriculum. This stage allowed us to understand not only the presence of the topic in the documents but also how it is conceived and incorporated (or not) into teacher training, revealing alignments, contradictions, and gaps.

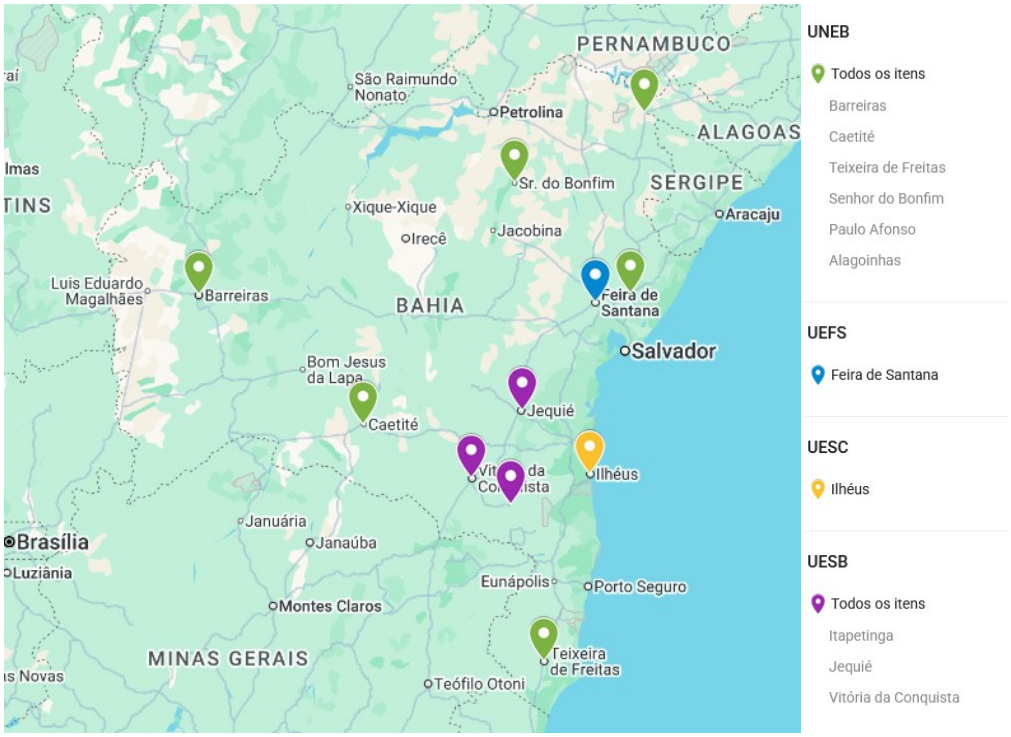
RESULTS AND DISCUSSION

The compilation and analysis of institutional documents (PPCs, curricular matrices, flowcharts, and syllabi) for the eleven on-campus Biological Sciences teaching programs at the four Bahian state universities (UNEB, UESB, UEFS, and UESC) revealed a heterogeneous picture, both in terms of curricular organization and in how FNE is treated as a training component in initial teacher education. The interpretation of the data was guided by the analytical categories defined a priori and refined throughout the documentary analysis, allowing us to identify recurring patterns and emerging themes across the programs studied.

Together, Bahia's four state universities form a network that spans the state's territory in a heterogeneous, decentralized manner. Each institution has its own particular features, reflecting management approaches adapted to local realities. Some are multi-campus universities — UNEB has 26 campuses across the state, and UESB has 3 — while others are based in a single municipality, as is the case for UEFS and UESC. The search showed that, among these public universities, the Biological Sciences teaching degree is offered at eleven campuses distributed across the state, as shown in Figure 1.

Figure 1

Geographic distribution of the programs analyzed

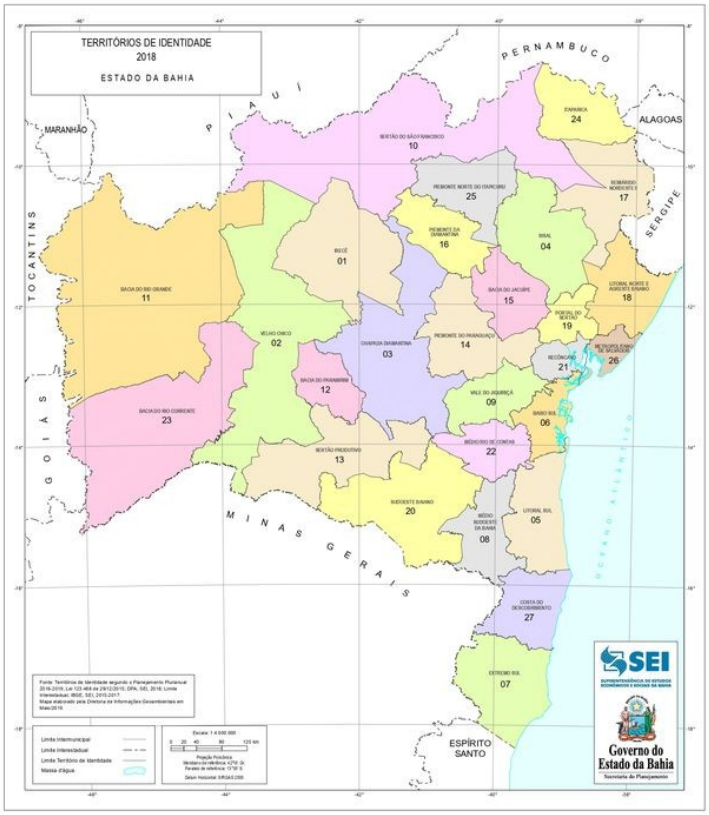


Source: prepared by the author with the aid of Google Maps (2025).

The state is divided into 27 "Territories of Identity," which are groupings of municipalities defined according to social, cultural, economic, and geographic criteria. This division is used strategically to design public policies that take each region's particularities into account. Each territory has its own distinctive cultural and historical features, its own economic vocation, and its own geopolitical characteristics. The distribution of these territories is shown in Figure 2.

Figure 2

Territories of Identity



Source: http://www.conselhodecultura.ba.gov.br/modules/conteudo/conteudo.php

From an environmental standpoint, the state encompasses three biomes: the Caatinga, the Atlantic Forest (Mata Atlântica), and the Cerrado, as shown in Figure 3.

Figure 3

Biomes

Source:
http://ftp.sei.ba.gov.br/Geoinformacao/cartograma/estado/carto_biomas_ba_6v5m_2004_cor.pdf

When we combine the geographic distribution of the programs with the Territory of Identity and the biome where each one is located, it becomes clear that each program is situated in a completely different local reality, as shown in Table 1. Each of the eleven programs is located in a different Territory of Identity, and the programs span all three of the state's biomes.

Table 1

Distribution of the programs across the state's Territories of Identity and biomes

University	Program/Municipality	Territory of Identity	Biome
UNEB	Barreiras	Bacia do Rio Grande	Cerrado
UNEB	Caetité	Sertão Produtivo	Caatinga
UNEB	Teixeira de Freitas	Extremo Sul	Atlantic Forest (Mata Atlântica)
UNEB	Senhor do Bonfim	Piemonte Norte do Itapicuru	Caatinga
UNEB	Paulo Afonso	Itaparica	Caatinga
UNEB	Alagoinhas	Litoral Norte e Agreste Baiano	Atlantic Forest (Mata Atlântica)
UEFS	Feira de Santana	Portal do Sertão	Caatinga
UESC	Ilhéus	Litoral Sul	Atlantic Forest (Mata Atlântica)
UESB	Itapetinga	Médio Sudoeste da Bahia	Caatinga
UESB	Vitória da Conquista	Sudoeste Baiano	Caatinga
UESB	Jequié	Médio Rio de Contas	Transition zone between Caatinga and Atlantic Forest

Source: Compiled by the author (2025)

This means that each campus is situated in a different climatic, environmental, historical, territorial, economic, cultural, and social context. One would therefore expect Science and Biology teacher training to be tailored to the characteristics of the local sociobiodiversity — covering the local vegetation, soils, fauna, climate, human-environment interactions, economic drivers, and the connections between the living environment and each place's history and culture. Yet, while each program's documents include an introduction characterizing its region, the curricular components themselves address these features only superficially. There are specific courses that touch on related content — such as Botany, Ecology, and Geology — but a full review of the course inventory (with syllabi) and program activities showed that no required or elective course, and no cross-cutting activity, intentionally builds links between local territories and biomes and the food environments in which they are situated.

This finding allows us to reflect on the first organizing principle of the Reference Framework for Food and Nutrition Education in Public Policies: "**Social, environmental, and economic sustainability**." According to the document, "the theme and challenges of sustainability take on a central role in reflecting on the dimensions of development and on the patterns of food production, supply, marketing, distribution, and consumption" (Brasil, 2012, p. 24). The expectation is that, through their training, Biology teachers should be able to understand the

environment in which they live and work, including all its social interrelations, with the conceptual tools to grasp the food systems they are part of. This foundational training matters because it underpins one of the expected features of FNE:

> When FNE promotes healthy eating, it refers to meeting the food needs of individuals and populations, in both the short and long term, in ways that do not require sacrificing renewable and non-renewable natural resources and that involve economic and social relations grounded in ethics, justice, equity, and sovereignty. (Brasil, 2012, p. 24)

Knowledge of the local sociobiodiversity, along with the economic and cultural system in which it sits, leads us to the second principle: "Approach to the food system as a whole." According to the Reference Framework on Food Systems and Climate for Public Policies, "a food system comprises distinct elements — health, environment, people, inputs, processes, infrastructure, institutions, and activities related to the production, processing, distribution, preparation, and consumption of food, as well as the outcomes of those activities, including socioeconomic and environmental consequences" (Brasil, 2025, pp. 8–9).

According to the FNE Framework, food systems encompass the processes that span access to land, water, and the means of production; the modes of processing, supply, marketing, and distribution; the choice and consumption of food, including individual and collective eating practices; and finally the generation and disposal of waste (Brasil, 2012).

Approaching food systems as a whole helps individuals and groups make conscious choices. Furthermore, it equips them with the critical training needed for their individual and collective choices to influence the stages of the food system that precede consumption — namely, what is produced and how it is produced, transported, and distributed.

All of the programs analyzed had required courses in botany, zoology, and ecology. Strikingly, however, four of the eleven programs do not have a required course on Environmental Education. The syllabus analysis revealed a biologically reductionist pattern with little evidence of critical-reflective work on how biological organisms fit into the broader systems they belong to or on the global implications of those systems.

Continuing the analysis of foundational courses, we observed that most Biological Sciences teaching programs include courses that allow students to understand the processes involved in eating and nutrition. All of the programs analyzed offered some form of biochemistry, very likely because it underpins concepts in other courses. With respect to Human Anatomy and Physiology, however, 3 programs did not include any course on the topic, although all of them offered equivalent courses on plant and animal anatomy and physiology. In the 8 programs that did cover human anatomy and physiology, it was notable that these are mostly overly condensed components, often combining both subjects into a single course with insufficient credit hours to cover essential content. As with the previous set of courses, the syllabus review revealed a fragmented structure grounded in biological concepts, with little evidence of critical reasoning, engagement with culture, or everyday application. Beyond the formal courses, we also examined the programs' other activities, finding no formal evidence of any intentional engagement with the topic.

These results suggest that, although the programs cover content fundamental to understanding food and nutrition, they tend to take a biologically reductionist approach — a pattern also documented elsewhere. Corrêa, Simões, and Simões (2024), in surveying Biology teachers in a municipality in Rio de Janeiro on basic concepts of food and nutrition education, found that the teachers — despite teaching on various topics that intersect with FNE — were unaware of important aspects of the field. As the authors put it, "the social, psychological, and cultural dimensions of FNE do not appear in their discourses, suggesting either ignorance of, or a failure to recognize, their importance for promoting healthy eating habits" (Corrêa & Simões, 2024, p. 4).

We then carried out a more focused analysis of intentional training for FNE, which by law must be addressed as a cross-cutting theme by all teachers throughout basic education (Brasil, 2018). The findings show that none of the programs analyzed include required courses directly related to FNE, while only one program offers a specific elective on the topic — with no record of it having been offered recently. We also examined the other program activities, including cross-cutting components, supplementary components, community-based activities, and research and outreach activities, and found that none of the programs included any activity (beyond required and elective coursework) that intentionally addressed food and nutrition education. This finding reveals a significant gap in training, especially given Biology's role in understanding vital processes, food, and human nutrition. The absence of FNE from Biology teacher-training curricula represents a gap between biological knowledge and the social dimension of food, weakening teachers' ability to engage with topics related to health promotion, food security, and sustainability (Halmann, 2025).

This training gap is a serious obstacle to building knowledge about food and nutrition as a whole, beyond the sum of disconnected biological concepts. The Law of Directives and Bases of National Education (LDB) requires that the topic be addressed in schools (Brasil, 2012), and it is also included as a required topic in the National School Feeding Program, which assigns nutritionists the role of coordinating such actions (Brasil, 2009). Furthermore, there is also the School Health Program, which has consistently shown that "the actions developed in schools are sporadic and unsystematic, occurring only as responses to specific demands, which limits the program's reach" (Bombach, Lara, & Marlise, 2022, p. 597).

The gap in teacher training—combined with the mandatory nature of the topic and policy documents that propose bringing other professionals into schools to handle it, rather than promoting cross-cutting and intersectoral integration—can end up pushing teachers away from these practices. A previous study analyzing the proceedings of ENPEC, an event specifically aimed at Science teachers, found that few papers addressed FNE, and most of those that did were not authored by Science/Biology teachers but rather by health professionals, in one-off actions disconnected from the school curriculum (Halmann & Oliveira, 2023).

These gaps lead us to consider the remaining principles set out in the Reference Framework for Food and Nutrition Education: "**Valuing local food culture and respecting the diversity of views and perspectives, recognizing the legitimacy of different forms of knowledge**"; "**Food and meals as reference points**"; "**Promotion of self-care and autonomy**"; "**Education as an ongoing process that**

fosters autonomy and the active, informed participation of individuals"; "**Diversity across practice settings**"; and "**Intersectoral collaboration**" (Brasil, 2012).

The food and nutrition education proposed by the Reference Framework goes beyond the one-way transmission of biological concepts. To understand eating, it is necessary to understand its connection to the environment that produces food, the economic interests that drive certain products to market over others, and the fact that individuals' food choices are preceded by macro-structural factors. Furthermore, eating must be understood as a cultural, historical, and political phenomenon. It must also be recognized that food is diverse—far more so than biological concepts alone can capture—that it is bound up with the traditional knowledge of communities and populations, and that valuing the act of preparing one's own food is an emancipatory political act, rather than a socially determined gender role.

Finally, food and nutrition education serves as a tool for promoting self-care and autonomy. Teachers are among the professional groups with the highest rates of illness, with a worrying prevalence of non-communicable chronic diseases (NCDs), along with a range of occupational illnesses directly linked to NCDs (Haikal, 2023). Furthermore, teachers' eating habits shape those of their students (Razuck, Fontes, & Razuck, 2011). Food and nutrition education should not be prescriptive; it must be well-grounded and consistent, addressing the physiological aspects of food while also recognizing that eating goes far beyond physiology, serving as a tool for self-care and the empowerment of both individuals and communities.

The findings show that, although the programs analyzed expose students to important concepts for FNE, no program intentionally addresses FNE in the form of a required course. None of the curricula mention FNE as a cross-cutting element or guiding theme of the program. Important foundational courses tend to be superficial and biologically reductionist, and in some programs they are missing entirely. A biologically reductionist approach to training diverges from the principles of FNE laid out in the Reference Framework. All of this leads us to argue that, although the Biological Sciences teaching degree — compared to other teaching degrees — is more closely aligned with the relevant concepts and is therefore a potentially important venue for training teachers to address FNE in schools, it also has substantial gaps when it comes to incorporating FNE as a pedagogical practice aimed at autonomy, citizenship, and sustainability. These findings suggest that the weakness of FNE in initial teacher training does not stem solely from the absence of specific curricular components, but rather from an insufficient curricular and pedagogical integration of the topic — which limits its ability to take hold as an educational practice in schools.

CONCLUSION

The analysis of the Biological Sciences teaching-degree curricula at Bahia's state universities showed that, although these programs provide important conceptual foundations for understanding the biological processes related to food and nutrition, Food and Nutrition Education (FNE) does not yet occupy a struc-

tured place in initial teacher training. None of the programs analyzed had a specific required course on FNE, and only one had an elective on the topic, with no evidence of it having been offered recently. This picture reveals the absence of any systematic, intentional approach to the topic in the pedagogical projects and curricular matrices, in contradiction with the public policies that recognize FNE as a mandatory cross-cutting theme in basic education.

The cross-cutting analysis of the curricular documents showed that Food and Nutrition Education (FNE) does not yet function as a structuring theme in initial teacher training. Although the programs cover content related to the biological aspects of food, there is no systematic, explicit, or pedagogically oriented approach to FNE in their curricular projects. It is worth emphasizing that, under Brazilian public policy, FNE is conceived as a cross-cutting theme — which calls for solutions that, grounded in local realities and driven by pedagogical intent, weave together knowledge and training strategies to ensure FNE is addressed throughout a teacher's training. In this sense, the gap identified in this study is not limited to the absence of dedicated courses; it also concerns the limited incorporation of FNE as an integrated, orienting element of training practices.

The findings reveal a predominance of biologically reductionist perspectives in the curricula, at the expense of the social, cultural, political, and environmental dimensions. As a result, teacher training drifts away from the organizing principles of the FNE Reference Framework, such as sustainability, valuing local food culture, intersectoral collaboration, and the promotion of autonomy. The absence of a critical, integrated approach limits future teachers' capacity to act as mediators of FNE in schools, weakening the realization of the Human Right to Adequate Food (DHAA) and the promotion of Food and Nutrition Security (SAN).

Despite these gaps, the Biological Sciences teaching degree proves to be a field with strong formative potential for incorporating FNE, since it brings together knowledge of the human body, ecology, the environment, and health. Recognizing this potential opens the way for designing curricula more closely aligned with public policy on food and nutrition, supported by interdisciplinary, context-sensitive pedagogical practices.

Given this picture, it is clear that preparing teachers — in their initial training — to engage with FNE in the contexts where they will work demands more than piecemeal revisions to existing curricula. It calls for the development of training projects that incorporate the topic on a cross-cutting, integrated, and ongoing basis, weaving together teaching, research, and outreach. This entails making FNE explicit in pedagogical projects, fostering integration across curricular components, and leveraging training spaces such as supervised teaching practicums and outreach activities, so as to support the development of critical, context-sensitive pedagogical practices.

Finally, we conclude that effectively embedding FNE in initial teacher training requires revising institutional and curricular guidelines so as to bring teacher-education policy closer to food and nutrition security policy. The integration of science, health, and food — mediated by critical and participatory methodologies — is an essential condition for future Biology teachers to be able to act, in schools, as educators who foster autonomy, citizenship, and sustainability.

NOTES

1. Tradução para o inglês realizada pelo profissional Luis Fernando Silva Pinto.

REFERENCES

Boog, M. (2009). *Educação nutricional*: da teoria à prática. São Paulo: Editora Senac.

Brasil (2002). Conselho Nacional de Educação. Câmara de Educação Superior. *Resolução CNE/CES nº 7, de 28 de janeiro de 2002*. Institui as Diretrizes Curriculares Nacionais para os cursos de graduação em Ciências Biológicas, bacharelado e licenciatura plena. Diário Oficial da República Federativa do Brasil, Poder Executivo, Brasília, DF, 29 jan. 2002. Seção 1, p. 30. http://portal.mec.gov.br/cne/arquivos/pdf/CES0702.pdf.

Brasil (2005). Ministério do Desenvolvimento e Assistência Social, Família e Combate à Fome. *Marco de Referência de Sistemas Alimentares e Clima para Políticas Públicas*. Brasília: MDS; Secretaria Nacional de Segurança Alimentar e Nutricional. https://www.gov.br/mds/pt-br/acoes-e-programas/promocao-da-alimentacao-adequada-e-saudavel/marco-de-referencia-sobre-sistemas-alimentares-e-clima-para-politicas-publicas/web_sistemas-alimentares_final.pdf.

Brasil (2006). Lei nº 11.346, de 15 de setembro de 2006. Cria o Sistema Nacional de Segurança Alimentar e Nutricional – SISAN com vistas em assegurar o direito humano à alimentação adequada e dá outras providências. Diário Oficial da União, Poder Executivo. Brasília. http://www.planalto.gov.br/ccivil_03/_ato2004-2006/2006/lei/l11346.htm .

Brasil (2009). Lei nº 11.947, de 16 de junho de 2009. Dispõe sobre o Programa Nacional de Alimentação Escolar (PNAE) e dá outras providências. *Diário Oficial da União*, Brasília, DF, 17 jun. 2009. http://www.planalto.gov.br/ccivil_03/_ato2007-2010/2009/lei/l11947.htm.

Brasil. Ministério do Desenvolvimento Social e Combate à Fome. (2012a). Marco de Referência de Educação Alimentar e Nutricional para as Políticas Públicas. MDS. Brasília: Ministério da Saúde.

Brasil (2012b). Ministério da Saúde. Secretaria de Atenção à Saúde. Departamento de Atenção Básica. *Política Nacional de Alimentação e Nutrição (PNAN)*. Brasília: Ministério da Saúde.

Brasil (2018a). Lei nº 13.666, de 16 de maio de 2018. Altera a Lei nº 9.394, de 20 de dezembro de 1996 (Lei de Diretrizes e Bases da Educação Nacional), para incluir o tema transversal da educação alimentar e nutricional nos currículos escolares da educação infantil, do ensino fundamental e do ensino médio, em âmbito nacional. *Diário Oficial da União*: seção 1, Brasília, DF, ano 155, n. 94, p. 1-2, 17 maio. http://www.planalto.gov.br/ccivil_03/_Ato2015-2018/2018/Lei/L13666.htm.

Brasil. Ministério da Educação. (2018c). Base Nacional Comum Curricular. MEC. Brasília, 2018.

Brasil (2018c). Ministério do Desenvolvimento Social e Combate à Fome. *Princípios e práticas para educação alimentar e nutricional*. Brasília, DF: MDS; CFN. https://www.mds.gov.br/webarquivos/arquivo/seguranca_alimentar/caisan/Publicacao/Educacao_Alimentar_Nutricional/21_Principios_Praticas_para_EAN.pdf

Brasil. Ministério da Educação. Conselho Nacional de Educação. (2019). Resolução CNE/CP nº 2, de 20 de dezembro de 2019: Diretrizes Curriculares Nacionais para a Formação de Professores da Educação Básica. MEC.

Brasil (2024). Conselho Nacional de Educação. Câmara de Educação Básica; Câmara de Ensino Superior. *Resolução CNE/CP nº 4, de 29 de maio de 2024*. Dispõe sobre as Diretrizes Curriculares Nacionais para a Formação Inicial em Nível Superior de Profissionais do Magistério da Educação Escolar Básica (cursos de licenciatura, cursos de formação pedagógica para graduados não licenciados e cursos de segunda licenciatura). *Diário Oficial da União*: seção 1, Brasília, DF, n. 104, p. 146. https://www.in.gov.br/web/dou/-/resolucao-cne/cp-n-4-de-29-de-maio-de-2024-563084558 .

Burlandy, L., & Maluf, R. (2010). Soberania Alimentar. In: Conselho Nacional de Segurança Alimentar e Nutricional. *A Segurança Alimentar e Nutricional e o Direito Humano à Alimentação Adequada no Brasil*: Indicadores e monitoramento, da Constituição de 1998 aos dias atuais. www.gov.br/secretariageral/pt-br/consea/acervo/documentos/resumo-executivo-final.pdf

Canesqui, A. M., & Garcia, R. W. D. (2005). *Antropologia e nutrição: um diálogo possível*. Rio de Janeiro: FioCruz.

Contreras, Jesús7& Gracia, Mabel (2011). *Alimentação, sociedade e cultura*. Rio de Janeiro: Editora FIOCRUZ.

Corrêa, E., Simões, E., & Soares, A. P. (2023). Uma visão biologicista sobre educação alimentar e nutricional: representações sociais e concepções de professores de ciências e biologia da rede pública de Barra Mansa/RJ. *Tudo é Ciência: Congresso Brasileiro de Ciências e Saberes Multidisciplinares*, *[S. l.]*, n. 2. DOI: 10.47385/tudoeciencia.1042.2023. https://conferencias.unifoa.edu.br/tc/article/view/1042.

Bombach, Gabriéli & Lara, Simone& Silveira , Marlise (2022). Análise das fragilidades e potencialidades do Programa Saúde na Escola a partir da percepção dos multiplicadores. *Revista Eletrônica Científica Ensino Interdisciplinar*, *[S. l.]*, v. 8, n. 26. https://periodicos.apps.uern.br/index.php/RECEI/article/view/3747.

Freire, Paulo (1996). *Pedagogia do oprimido*. 17. ed. Rio de Janeiro: Paz e Terra.

Haikal, D. S.& Prates, T. E. C.& Vieira, M. R. M.& Magalhães, T. A.& Baldo, M. P., Paula, A. M., & Ferreira, E. F. (2023). Fatores de risco e proteção para doenças crônicas não transmissíveis entre professores da educação básica. *Revista Brasileira De Saúde Ocupacional*, v. 48, p. e5. https://doi.org/10.1590/2317-6369/42520pt2023v48e5

Halmann, Adriane (2024). A pesquisa sobre Educação Alimentar e Nutricional no Brasil. *Ensino de Ciências e Tecnologia em Revista – ENCITEC* , v. 14, n. 3, p. 474-483. https://san.uri.br/revistas/index.php/encitec/article/view/1984

Halmann, Adriane & Oliveira, Alexandra (2023). Educação Alimentar e Nutricional na escola: panorama de interfaces e lacunas. In.: CARVALHO, Amanda; BASTOS, Ricardo; ROCHA, Bruna; IVANICSKA, Rebeca (Org.). *Vozes da saúde*: conhecimentos em diálogos escritos. Itapiranga : Schreiben. pp. 98-117

Lüdke, Menga & André, Marli Eliza Dalmazo Afonso de (1986). *Pesquisa em educação*: abordagens qualitativas. São Paulo: EPU.

Morais, W. R., Araújo, A. F. de, Santos, A. W. dos, & Silva, O. F. (2025). Formação de professores(as) socioambientais: diálogos entre Paulo Freire e Edgar Morin. *ACTIO*, *10*(2), 1–19. https://doi.org/10.3895/actio.v10n2.19722

Moura, Francisco Nunes de Sousa (2025). A educação alimentar e nutricional no ensino fundamental à luz dos referenciais curriculares da região nordeste do Brasil. 2025. 152 f. Tese (Doutorado em Educação) – Programa de Pós- Graduação em Educação, Faculdade de Educação, Universidade Federal do Ceará, Fortaleza. http://repositorio.ufc.br/handle/riufc/80615.

Razuck, R. C. D. S. R.& Fontes, P. G.& Razuck, F. B (2011). A Influência do professor nos hábitos alimentares. In: *Anais do ENCONTRO NACIONAL DE PESQUISA EM EDUCAÇÃO EM CIÊNCIAS*, Campinas. https://abrapec.com/atas_enpec/viiienpec/resumos/R0048-2.pdf .

Weirich, Juciele Weirich & Meti, Magali de Moraes (2022). Inclusão da educação alimentar e nutricional nos currículos escolares. *Research, Society and Development*, *[S. l.]*, v. 11, n. 10, p. e545111033042. https://rsdjournal.org/rsd/article/view/33042 .

Received: Nov. 10, 2025
Approved: Apr. 6th, 2026
DOI: https://doi.org/10.3895/actio.v11n2.21174

How to cite:
Halmann, A. L. (2026). Between science, health, and food: an analysis of how the principles of food and nutrition education are applied in the trai-ning of biology teachers at the state universi-ties of Bahia. ***ACTIO***, 11(2), 1-19. https://doi.org/10.3895/actio.v11n2.21174

Recebido: 10 nov. 2025
Aprovado: 06 abr. 2026
DOI: https://doi.org/10.3895/actio.v11n2.21174

Como citar:
Halmann, A. L. (2026). Entre ciência, saúde e alimentação: análise da aplicação dos princípios da educação alimentar e nutricional na formação de professores de ciências biológicas nas universidades estaduais da Bahia. ***ACTIO***, 11(2), 1-19. https://doi.org/10.3895/actio.v11n2.21174