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# COMPARATIVE RESEARCH REPORT

## GARDENS PROJECT

**fosterinG eco-heAlthy nutRitional attituDEs in the  
school population through hybrid educationAl  
Schemes**

**Project Code:**

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## 1. INTRODUCTION

The GARDENS project – fosterinG eco-heAlthy nutRitional attitudEs in the school population through hybrid educatioNal Schemes – is a strategic initiative under the Erasmus+ KA220-SCH program, designed to address the urgent need for improved nutritional literacy and sustainable food practices among the European school population. By integrating hybrid educational methodologies, including experiential learning, digital tools, and interdisciplinary teaching, GARDENS seeks to instill healthier dietary habits and foster a stronger environmental consciousness in students from an early age. A fundamental pillar of the project is the recognition that teachers play a pivotal role in shaping the attitudes, knowledge, and behaviors of their students. Teachers not only transmit formal curriculum content but also model daily habits and informal norms that deeply influence children's long-term behaviors. Consequently, assessing teachers' own nutritional knowledge, personal dietary habits, attitudes toward sustainability, and lifestyle behaviors is essential for identifying both strengths and gaps within the current educational ecosystem. This comprehensive understanding enables the design of more targeted, effective interventions that can be seamlessly integrated into everyday educational practices. By empowering teachers with accurate, up-to-date knowledge and practical tools, the GARDENS project aims to create a multiplier effect, where teachers become ambassadors of health, sustainability, and well-being not only within their classrooms but also within the broader school community and society at large. In a context where childhood obesity, diet-related diseases, and environmental degradation are escalating public health concerns across Europe and beyond, the GARDENS project responds with a proactive, systemic approach. Rather than treating nutrition and sustainability education as isolated topics, GARDENS envisions them as cross-cutting priorities embedded throughout school life – across subjects, school meals, extracurricular activities, and community partnerships. This Comparative Analysis Report serves as a cornerstone in achieving these goals. By examining the baseline knowledge, habits, and perceptions of teachers across five culturally diverse countries – Italy, Guadeloupe (France), Serbia, Germany, and Cyprus – we aim to highlight shared trends, local specificities, and actionable pathways for building healthier, more resilient school environments across Europe.

## 2. METHODOLOGY

To ensure the reliability, validity, and comparability of data across different cultural and national contexts, a standardized questionnaire was developed and administered to teachers in the five participating countries: Italy, Guadeloupe (France), Serbia, Germany, and Cyprus.

The questionnaire was meticulously designed to capture a comprehensive view of the participants' knowledge, attitudes, and behaviors related to:

- Basic nutrition concepts, including the understanding of the Mediterranean Diet, macronutrients, and healthy portioning.
- Sustainability in food choices, with a focus on awareness of sustainable diets, food biodiversity, and environmental impacts of dietary habits.
- Hydration and lifestyle practices, assessing water consumption, physical activity levels, and sedentary behaviors.
- Food label literacy, examining habits around reading and interpreting nutritional information on packaged foods.

The survey instrument combined quantitative (closed-ended, multiple-choice, and Likert scale questions) and qualitative (open-ended questions for reflections and explanations) approaches to gather both measurable indicators and richer, context-sensitive insights.

### **Administration process**

Each partner organization was responsible for:

- Translating and culturally adapting the questionnaire where necessary, ensuring semantic equivalence while preserving the core content and meaning.
- Administering the survey either online or in-person, depending on local logistical possibilities and participant preferences.

- Encouraging voluntary and anonymous participation to guarantee honest and unbiased responses.

All participants were provided with an explanation of the study's objectives, procedures, and confidentiality measures before completing the questionnaire.

### **Data management and analysis**

Data collected were processed through a combination of:

- Descriptive statistics (percentages, means, distributions) to present an overall profile of responses by country.
- Comparative cross-country analysis to highlight trends, strengths, gaps, and differences across the five national contexts.
- Qualitative thematic analysis of open-ended responses, identifying recurring themes, perceptions, and suggestions proposed by teachers.

A special emphasis was placed on ensuring cultural relevance and comparability, allowing results to reflect both commonalities and country-specific particularities without imposing a one-size-fits-all framework.

### 3. PARTICIPANTS OVERVIEW

The field research involved a broad and diverse sample of teachers from primary and lower secondary schools across the five participating countries: Italy, Guadeloupe (France), Serbia, Germany, and Cyprus. Special attention was given during participant recruitment to ensure a representative and balanced sample, both in terms of demographic characteristics and professional profiles.

#### **Gender balance and diversity**

Efforts were made to maintain a balanced gender representation among the respondents. While slight variations occurred depending on national contexts—reflecting the natural gender distribution among teaching staff in each country—overall, the sample reflected a fair proportion of female and male teachers. This aspect was crucial, given that gender can influence perceptions, attitudes, and behaviors toward health and sustainability practices.

#### **Professional backgrounds and teaching subjects**

The participants represented a diverse range of teaching disciplines, including but not limited to:

- Science and Biology (critical for direct integration of nutritional education)
- Physical Education (linking diet, hydration, and active lifestyles)
- Civic Education (where concepts of sustainability and environmental responsibility are discussed)
- General Primary School Teaching (where holistic health education is embedded across various subjects)

This variety enriched the study, allowing for an exploration of how different curricular areas and professional specializations influence teachers' nutrition knowledge and sustainability awareness.

### **Geographical distribution**

Respondents were drawn from urban, peri-urban, and rural areas within each participating country, ensuring that the sample captured different environmental, economic, and cultural realities that can impact both personal behaviors and teaching practices related to food and health.

For instance:

- In Italy, teachers from both mainland and island regions (e.g., Sardinia) participated.
- In Guadeloupe, participants brought perspectives rooted in a tropical island context with a strong Creole food tradition.
- Serbian participants represented a mix of metropolitan areas like Belgrade and smaller provincial towns.
- German participants were mainly concentrated in the Berlin-Brandenburg region, offering insights from a highly urbanized educational setting.
- Cypriot teachers provided a Mediterranean insular perspective, with its particular emphasis on traditional food culture.

## 4. COMPARATIVE ANALYSIS OF SURVEY RESULTS

### 4.1 Teachers' knowledge of mediterranean diet and balanced nutrition

#### Understanding of the mediterranean diet pyramid

The Mediterranean Diet Pyramid represents not only a nutritional model but also a cultural heritage of sustainable and healthy eating. Analysis across the five countries revealed significant differences in teachers' familiarity and understanding of this model: Italy and Cyprus reported the highest levels of awareness, with the majority of teachers demonstrating strong knowledge of the food categories, recommended frequencies of consumption, and the lifestyle components (e.g., daily physical activity, social meals) embedded in the Mediterranean model. This reflects the fact that in these countries, the Mediterranean diet is part of both cultural identity and public health policies.

In Germany, although awareness of healthy eating principles was high, specific familiarity with the structure of the Mediterranean Diet Pyramid was limited. Teachers often knew about healthy food groups (like fruits and vegetables) but lacked understanding of the diet's holistic aspects, such as the prioritization of plant-based foods and the reduction of red meat and processed products.

Serbia showed a partial awareness. While teachers recognized the value of fruits, vegetables, and legumes, there was less emphasis on differentiating between types of fats or on lifestyle elements like communal eating.

In Guadeloupe, knowledge of the Mediterranean diet was minimal, understandable given the island's distinct Creole cultural and culinary background. Teachers' dietary models were instead based more on local traditional foods and tropical products.

#### Balanced diet awareness

When asked about the principles of a balanced diet:

Teachers from Italy and Cyprus demonstrated the most comprehensive understanding, often citing correct proportions of carbohydrates, proteins, and fats.

German teachers exhibited good theoretical understanding but admitted challenges in translating these into everyday meals due to lifestyle constraints.

Serbian and Guadeloupean participants showed awareness at a basic level but frequently misinterpreted the role of certain food groups (e.g., overemphasis on protein, underestimation of the role of healthy fats).

### **Practical application in daily life**

Despite variations in theoretical knowledge, the practical application of balanced eating principles was more nuanced:

In Italy and Cyprus, many teachers reported aligning their personal eating habits with the Mediterranean model, frequently incorporating fruits, vegetables, legumes, olive oil, and whole grains into their diets.

In Germany, time pressure and convenience often led to more reliance on processed or quick meals despite awareness of healthier options.

In Serbia and Guadeloupe, economic factors and availability of certain foods influenced daily food choices, sometimes limiting the application of optimal dietary guidelines.

## **4.2 Macronutrients and portion sizes**

Understanding the role of macronutrients — carbohydrates, proteins, and fats — is essential for promoting balanced nutrition and preventing diet-related chronic diseases. Moreover, awareness of appropriate portion sizes is a key factor influencing calorie intake and overall health outcomes. The GARDENS survey revealed significant variations among countries in teachers' knowledge and practical application of these concepts.

### **Knowledge of macronutrients**

Italy and Cyprus demonstrated strong performance in identifying food sources rich in specific macronutrients. Most teachers correctly classified staple foods such as pasta and bread as carbohydrate sources, olive oil and nuts as fat sources, and legumes and fish as

protein sources. This reflects both cultural familiarity with these foods and successful integration of nutritional guidelines into educational campaigns and public health programs.

In Germany, while general awareness was good, confusion persisted regarding the classification of complex versus simple carbohydrates. Teachers sometimes underestimated the nutritional differences between refined and whole-grain products.

Serbia presented partial knowledge. Teachers frequently associated meat as the primary source of protein but showed less awareness about plant-based proteins such as beans and lentils — a key aspect of sustainable nutrition.

Guadeloupe showed the most pronounced gaps. Teachers often struggled to correctly associate common foods with their dominant macronutrient category, reflecting a need for foundational nutritional education, possibly adapted to local food products and traditions.

### **Awareness of portion sizes**

Portion size awareness was generally lower across all countries compared to knowledge of food groups:

In Italy and Cyprus, a moderate number of teachers were able to describe standard portion sizes for fruits, vegetables, and grains, but difficulties arose in estimating portions for fats and oils.

German teachers demonstrated theoretical understanding but highlighted practical difficulties in implementing portion control, especially in a context of busy lifestyles and reliance on prepackaged foods.

Serbia and Guadeloupe showed limited familiarity with portion control recommendations. This gap suggests an area of priority for interventions, especially considering the growing concern of obesity and overweight in both regions.

Teachers across all countries agreed that visual aids (e.g., food portion hand guides, plate models) would help reinforce correct portion size estimation among students and families.

### 4.3 Whole vs. processed foods

Distinguishing between whole foods — those minimally processed and close to their natural state — and processed foods, often higher in added sugars, salts, and unhealthy fats, is fundamental for promoting a healthy diet and preventing chronic disease. The GARDENS project survey explored teachers' understanding and personal practices regarding this critical distinction, revealing marked differences across countries.

#### **Knowledge of whole vs. processed foods**

Italy and Cyprus exhibited the highest levels of awareness regarding the concept of whole foods.

Italian and Cypriot teachers could easily recognize examples of whole foods (e.g., fresh fruits, vegetables, whole grains, legumes) and processed foods (e.g., packaged snacks, sugary beverages, ready meals).

This is likely influenced by the strong culinary traditions emphasizing fresh, minimally processed ingredients and by public health campaigns promoting the Mediterranean diet principles.

In Germany, teachers showed moderate understanding. While they often associated fresh foods with health benefits, there was some ambiguity about the classification of certain items, such as commercially packaged "healthy snacks" or processed meats, reflecting the complexity of food marketing in highly developed economies.

Serbia presented mixed results. While teachers recognized highly processed items like candies and sodas, there was less clarity regarding more subtly processed foods, such as white bread or canned vegetables.

Guadeloupe revealed the most significant gaps. Teachers demonstrated limited differentiation between whole and processed foods, often due to the heavy presence of imported, packaged foods in local diets and lower exposure to structured nutritional education campaigns.

### **Personal food preferences and habits**

Teachers from Italy and Cyprus indicated a strong preference for whole foods in their own diets, citing frequent consumption of fresh fruits, vegetables, legumes, and whole grains. In Germany, despite awareness, convenience and time constraints often led to higher consumption of processed foods, especially among teachers living in urban environments.

Serbia and Guadeloupe reported greater reliance on processed foods, driven by affordability, accessibility, and, in some cases, ingrained dietary habits.

Moreover, across all countries, there was a shared concern regarding students' increasing exposure to ultra-processed foods through school vending machines, advertising, and social media, highlighting the need for systemic school-wide policies promoting healthier food environments.

## **4.4 Hydration and energy sources**

Adequate hydration and a clear understanding of the body's primary energy sources are fundamental components of a healthy lifestyle and effective nutritional education.

In the GARDENS project survey, these aspects were evaluated to determine teachers' theoretical knowledge and practical habits across the five countries.

### **Understanding of hydration importance**

Across all participating countries, teachers consistently recognized the critical role of water in maintaining health.

In Italy and Cyprus, virtually all respondents emphasized hydration as essential for physiological functions, cognitive performance, and physical well-being.

Germany showed a similarly high awareness level, supported by national health campaigns advocating water as the beverage of choice.

In Serbia and Guadeloupe, although general awareness existed, hydration practices were sometimes undervalued, particularly in the context of long working hours and limited school-based hydration promotion.

This strong theoretical knowledge base provides a positive foundation for further reinforcing hydration habits among students through school policies and daily modeling.

### **Daily water intake among teachers**

Despite widespread recognition of its importance, actual water intake behaviors varied:

In Italy, Germany, and Cyprus, a significant proportion of teachers reported consuming the recommended 1.5 to 2 liters of water per day.

In Serbia and Guadeloupe, lower daily intake rates were observed, with many teachers consuming less than 1 liter per day.

Contributing factors included the availability of sugary drinks, insufficient infrastructure for water provision in schools, and cultural beverage preferences.

Teachers from all countries noted that reminders and better access to clean drinking water at school would facilitate improved hydration among both staff and students.

### **Knowledge of main energy sources**

Understanding the body's primary energy sources — predominantly carbohydrates — is critical for promoting balanced eating patterns:

Teachers in Italy and Cyprus demonstrated strong understanding, accurately identifying complex carbohydrates (such as whole grains, legumes, fruits, and vegetables) as essential daily energy providers.

German teachers also showed good knowledge but sometimes underestimated the distinction between "good" and "bad" carbohydrates, reflecting broader challenges in public nutritional discourse.

Serbian and Guadeloupean teachers displayed significant confusion, with some participants mistakenly citing vitamins or proteins as the main daily energy source.

This misperception has serious educational implications, potentially leading to misconceptions about energy balance and proper meal planning in the school context.

## 4.5 Physical activity and lifestyle habits

The relationship between physical activity, sedentary behaviors, and overall lifestyle habits is crucial for promoting long-term health and well-being.

In the GARDENS project survey, particular attention was given to assessing teachers' awareness of the importance of movement and their own engagement in healthy lifestyle practices.

### **Awareness of physical activity importance**

Across all five countries, teachers consistently recognized the critical role of physical activity in maintaining both physical and mental health:

In Italy, Germany, and Cyprus, teachers demonstrated high levels of theoretical awareness, often linking exercise with cardiovascular health, stress reduction, and improved cognitive function.

Serbian and Guadeloupean teachers also acknowledged the value of regular physical activity, though with slightly less emphasis on its role in mental health.

This widespread awareness represents a solid foundation for promoting school-based initiatives that integrate movement into the daily routines of both students and teachers.

### **Healthy physical activities practiced by teachers**

When asked about their personal engagement in physical activity:

Italian, German, and Cypriot teachers reported regular exercise habits, including activities such as walking, swimming, yoga, and organized sports.

Urban infrastructure, cultural appreciation for outdoor activities, and work-life balance policies likely contributed to these positive behaviors.

In Serbia, physical activity was practiced less consistently. Barriers such as long working hours, limited access to recreational facilities, and economic constraints were frequently cited.

In Guadeloupe, although some teachers engaged in walking and outdoor sports, environmental and infrastructural challenges (e.g., hot climate, lack of safe walking paths) limited the regularity of exercise.

Teachers who were more physically active also tended to model healthier behaviors for their students, reinforcing the concept of teachers as health role models.

### **Unhealthy habits identified**

Despite general awareness, several unhealthy lifestyle habits were observed:

Sedentary behavior (long periods of sitting during work or leisure) was a common issue, especially among teachers in Serbia and Guadeloupe.

Some teachers across all countries reported struggles with work-related stress, irregular sleep patterns, and over-reliance on convenience foods, which can negatively interact with physical inactivity to amplify health risks. Participants suggested that school-based wellness programs — including active breaks, staff fitness classes, and walking meetings — could support healthier behaviors among educators.

## **4.6 Sustainability and food label literacy**

Incorporating sustainability principles into dietary choices and fostering food label literacy are pivotal elements of modern nutritional education.

These competencies enable individuals to make informed food choices that are not only healthier but also environmentally responsible.

The GARDENS survey investigated the level of teachers' knowledge and behaviors regarding these two critical areas, revealing significant cross-country differences.

### **Understanding of sustainable diets**

Germany and Cyprus emerged as the most advanced in terms of sustainability knowledge.

German teachers, often influenced by strong national movements around organic agriculture and environmentalism, demonstrated a clear understanding of the connections between food choices, carbon footprints, biodiversity, and health.

Similarly, Cypriot teachers showcased a growing awareness, particularly in relation to the Mediterranean Diet's inherently sustainable characteristics (e.g., high consumption of local, plant-based foods).

Italy showed good but slightly less structured awareness. While many Italian teachers intuitively associated local, seasonal eating with sustainability, fewer were able to articulate broader concepts like life cycle assessments or global food system impacts.

Serbia and Guadeloupe displayed limited understanding of sustainable diets. In these regions, immediate health benefits of food choices were better known than their environmental implications. Structural factors, such as lower access to organic products and less emphasis on sustainability in national curricula, likely contributed to these gaps.

Teachers across all countries agreed that sustainability should be more systematically integrated into school programs, linking personal health with planetary health.

### **Food label reading habits**

Reading and interpreting food labels — particularly nutritional panels and sustainability certifications — is crucial for empowering consumers to make conscious choices.

- Teachers in Germany and Italy reported high rates of label reading, often checking nutritional content, ingredient lists, and sustainability certifications (e.g., organic, fair-trade labels) before purchasing.
- Cyprus showed a moderate level of label engagement. While many teachers checked basic nutritional information (e.g., sugar and fat content), fewer consistently looked for sustainability indicators.
- In Serbia and Guadeloupe, food label literacy was lower. Teachers reported difficulties in understanding complex labels and noted that clear, standardized

labeling practices were less common in their markets, making informed choices more challenging.

Furthermore, across all countries, teachers indicated that training on label reading would be valuable, both for their personal lives and for better educating students to navigate a complex food market.

The results of the GARDENS comparative analysis reaffirm a fundamental truth: education is the seed of transformation.

In classrooms across Europe and beyond, teachers have the unique opportunity — and the profound responsibility — to nurture a generation capable of making informed, conscious choices for their health and for the planet.

The findings demonstrate that while awareness of nutrition and sustainability is growing, knowledge must be deepened, habits must be strengthened, and systematic support must be expanded.

Bridging the gap between knowing and doing — between awareness and action — requires more than isolated initiatives; it demands an integrated, systemic approach.

Through strategic investments in teacher training, curriculum innovation, community engagement, and infrastructure development, schools can become vibrant hubs of health promotion and sustainability leadership.

In this vision, teachers are not just transmitters of knowledge, but active change-makers, inspiring students, families, and communities to cultivate lifestyles rooted in well-being, responsibility, and resilience.

The GARDENS project shows that transformation is not only possible — it is already underway.

By building on the strengths identified, addressing the gaps revealed, and fostering collaboration across borders, we can ensure that the seeds we plant today grow into a future where eco-healthy nutritional attitudes are the norm, not the exception.

Together, through education, action, and hope, we move toward a healthier, more sustainable future for all.

## 4.7 Students' awareness of nutrition and balanced eating

A deep understanding of what constitutes healthy eating among students is a cornerstone for promoting long-term health and well-being. The GARDENS survey explored students' theoretical knowledge and practical application of nutritional principles across the five participating countries.

### **Understanding of healthy eating concepts**

In Italy, approximately 70.6% of students demonstrated awareness of the importance of daily fruit and vegetable consumption. However, only 32.7% were able to accurately describe the characteristics of a balanced diet, revealing a gap between general knowledge and comprehensive nutritional understanding.

In Germany, students exhibited strong baseline knowledge, particularly regarding the importance of plant-based foods and hydration. Nonetheless, some misconceptions persisted, especially about the energy-providing role of carbohydrates versus vitamins.

In Cyprus, students reflected a cultural alignment with Mediterranean diet values but showed inconsistencies in translating this into daily dietary practices, often due to the influence of modern processed foods.

In Serbia, students had partial knowledge, often limited to basic slogans ("eat more vegetables") without a clear understanding of food group distribution or balanced meal planning.

In Guadeloupe, students displayed a good habit of consuming tropical fruits but lacked a broader awareness of balanced dietary composition, largely influenced by westernized dietary patterns.

### **Practical dietary habits**

While 34.4% of Italian students self-reported "eating healthily," food consumption data indicated high levels of processed snack intake, suggesting a discrepancy between

perceived and actual behaviors.

German and Cypriot students showed good fruit and vegetable intake on school days but frequently skipped breakfast, especially among adolescents, undermining overall dietary balance.

Serbian and Guadeloupean students revealed higher consumption of sugary drinks and processed snacks, with breakfast being the most commonly skipped meal.

#### **4.8 Students' knowledge of macronutrients and food groups**

Understanding macronutrient roles is vital for forming healthy eating habits among adolescents. The GARDENS survey examined students' ability to recognize the nutritional content of everyday foods across the five countries.

In Italy, only 27.5% of students correctly associated foods with their dominant macronutrient, revealing significant gaps in applied food literacy. German students fared slightly better, distinguishing fats from proteins with greater accuracy, but still showed confusion between complex and simple carbohydrates. Cypriot students demonstrated a strong knowledge of local staples like legumes and olive oil, but many lacked awareness of hidden sugars and fats in processed snacks.

Students in Serbia and Guadeloupe showed the lowest levels of accuracy, with many incorrectly identifying protein as the main energy source and failing to distinguish between beneficial fats and unhealthy processed options. These results point to an urgent need for structured education on basic nutritional science, supported by food classification activities and visual learning tools.

## 4.9 Hydration practices among students

Hydration is essential for metabolic function and cognitive performance, particularly in growing adolescents. While most students understood the importance of drinking water, practices varied widely.

In Italy, 92% of students acknowledged water's importance, yet nearly one in four reported drinking less than 1 liter per day. In Germany, students reported better hydration habits, in part due to school policies promoting water over sugary beverages. Cyprus showed a mixed picture: high water intake in summer, but regular consumption of soft drinks year-round.

Serbia and Guadeloupe demonstrated the poorest hydration practices. Students in these countries often consumed sugary or flavored drinks instead of water, influenced by cultural norms and marketing. Promoting water availability in schools and embedding hydration awareness into health education curricula are critical next steps.

## 4.10 Students' sustainability awareness and eco-healthy attitudes

Understanding the environmental impact of food choices is a key skill for responsible citizenship. The GARDENS survey assessed whether students connected their eating habits to broader sustainability principles.

Germany emerged as the most sustainability-literate, with students referencing concepts like food miles, seasonal produce, and climate-friendly diets. In Cyprus and Italy, awareness was present but often tied to traditional Mediterranean food culture rather than global environmental frameworks.

In Serbia and Guadeloupe, sustainability awareness was minimal, with many students unfamiliar with the term or unable to relate it to food choices. This highlights a critical

gap in citizenship education and calls for cross-disciplinary teaching approaches that include sustainability in both science and civic education.

#### **4.11 Food label reading and sustainable consumption practices**

Being able to read and interpret food labels is an essential consumer skill that helps adolescents make informed dietary choices. The GARDENS project explored how frequently and effectively students across countries engaged with food labels.

In Germany and Italy, many students reported reading food labels, focusing particularly on sugar content and fat composition. German students also recognized organic and sustainability certifications. Cypriot students showed some familiarity with nutrition labels but limited engagement with environmental logos.

In contrast, students in Serbia and Guadeloupe rarely read food labels or understood their meaning. Many expressed confusions or admitted skipping this step altogether when buying packaged foods. These findings underscore the need for label-reading workshops in schools, ideally integrated into science and health subjects through practical exercises.

## 5. SUMMARY OF FINDINGS

The GARDENS Comparative Analysis reveals a multifaceted picture of nutrition and sustainability literacy across teachers and students in five diverse contexts: Italy, Guadeloupe, Serbia, Germany, and Cyprus.

### Strengths identified

- Teachers and students across all countries recognized the importance of fruits and vegetables in a healthy diet.
- Hydration awareness was high among both teachers and students, particularly in Italy, Germany, and Cyprus.
- Physical activity was valued across the board, especially among teachers in Germany and Cyprus.
- Teachers in Germany and Cyprus, and students in Germany, demonstrated advanced understanding of sustainability and eco-healthy dietary behaviors.
- Teachers and students in Italy and Cyprus showed familiarity with Mediterranean diet principles and a cultural preference for whole foods.
- Teachers often served as positive role models, with their own habits influencing schoolwide food culture.

### Key areas for improvement

- Students showed substantial gaps in macronutrient knowledge, with widespread confusion about the role of carbohydrates, fats, and proteins, particularly in Serbia and Guadeloupe.
- Hydration habits were not consistently practiced, despite awareness — especially among students in Guadeloupe and Serbia.
- Food label literacy was limited among students in all countries except Germany and Italy.
- Teachers and students in Serbia and Guadeloupe demonstrated the lowest levels of awareness about sustainable diets and food-related environmental impacts.
- Students often overestimated the healthiness of their diets, with processed food

consumption and sugary drink intake remaining high.

### **Cross-cutting observations**

The comparison shows that while awareness exists in both student and teacher populations, actionable knowledge and behavioral consistency remain a challenge. Teachers are in a unique position to support improved student outcomes, but require tools, training, and institutional support to do so.

Further alignment between teacher and student training efforts, and integration of food literacy into school curricula, will be essential to build a truly sustainable food culture in education systems.

The comparative analysis of the GARDENS project survey across Italy, Guadeloupe, Serbia, Germany, and Cyprus has revealed a rich and complex landscape of strengths, weaknesses, and educational needs in relation to teachers' nutritional knowledge, sustainability awareness, and lifestyle behaviors.

Several key patterns emerged consistently across the participating countries, providing a solid foundation for both targeted interventions and broader educational reforms.

### **Strengths identified**

- High awareness of the importance of fruits and vegetables  
Across all countries, teachers recognized the central role that fruits and vegetables play in a healthy diet. Italy and Cyprus, in particular, demonstrated a deep cultural connection to fresh, plant-based foods, reflecting the heritage of the Mediterranean diet.
- Widespread understanding of hydration needs  
Teachers uniformly acknowledged the critical importance of maintaining adequate hydration. Italy, Germany, and Cyprus showed strong personal hydration habits, although Serbia and Guadeloupe lagged behind in daily water intake.
- General recognition of physical activity benefits  
Awareness of the health benefits of physical activity was high among teachers in

all countries. Germany, Italy, and Cyprus reported greater alignment between knowledge and personal behavior, while Serbia and Guadeloupe cited infrastructural and lifestyle barriers.

- Emerging awareness of sustainable diet concepts  
Germany and Cyprus demonstrated significant progress in connecting food choices with environmental impacts, suggesting that sustainability literacy is becoming an integral part of nutritional education in these countries.
- Commitment to healthy school environments  
Many teachers expressed strong support for embedding healthier food choices and sustainability principles within their school communities, recognizing their dual role as educators and role models.

### **Key areas for improvement**

- Incomplete understanding of macronutrients and energy sources  
Despite general nutrition awareness, confusion persisted in all countries — especially Serbia and Guadeloupe — regarding the functions of carbohydrates, proteins, and fats, as well as the primary sources of daily energy.
- Gaps in practical portion size awareness  
Teachers across all countries demonstrated only moderate understanding of recommended portion sizes, particularly for fats, oils, and energy-dense foods.
- Misconceptions regarding whole vs. processed foods  
While Italy and Cyprus excelled, Germany, Serbia, and Guadeloupe showed varying degrees of uncertainty when distinguishing between minimally processed and ultra-processed foods.
- Limited food label literacy in some regions  
Germany and Italy led in regular label reading and interpretation, but lower engagement was noted in Cyprus, Serbia, and Guadeloupe. The ability to decode complex food labeling remains an educational priority.
- Partial integration of sustainability into dietary practices  
Although theoretical awareness of sustainability is growing, especially in

Germany and Cyprus, practical integration into daily dietary behaviors remains incomplete in all countries.

- Physical inactivity and sedentarism

Sedentary behavior, exacerbated by modern work demands and infrastructural challenges, was identified as a rising concern, particularly in Serbia and Guadeloupe.

### **Cross-Cutting Observations**

Overall, the findings point to a positive general awareness of health and sustainability concepts among teachers. However, there remains a critical need to bridge the gap between knowledge and practice, ensuring that teachers not only understand the principles of healthy and sustainable living but also embody them consistently in their daily lives and teaching practices. Furthermore, differences across countries highlight the importance of culturally sensitive interventions, tailored to specific local needs, infrastructures, and culinary traditions.

## 6. RECOMMENDATIONS FOR ACTION

Building a culture of nutrition and sustainability within schools requires systemic, multilevel interventions that address both teachers and students, and actively involve families and the wider community.

### 1. Strengthen teacher and student training on practical nutrition and sustainability

- Provide dual-level training programs that simultaneously educate teachers and empower students.
- Include clear modules on macronutrients, hydration, food labels, and eco-friendly consumption.
- Incorporate interactive and age-appropriate materials for students, using gamified apps, school garden sessions, and project-based learning.

### 2. Encourage daily hydration and physical activity

- Install water fountains and ensure all students have access to clean drinking water throughout the school day.
- Promote hydration tracking activities for students, led by teachers.
- Integrate movement into the daily school schedule: classroom stretch breaks, outdoor play, “active lessons.”
- Organize community sports or wellness events for students, staff, and families.

### 3. Integrate food and sustainability literacy across the curriculum

- Develop cross-disciplinary units that address food systems in science, civic education, geography, and health education.
- Include label-reading exercises and nutrition interpretation in mathematics and language activities.
- Use student peer education strategies where older students guide younger pupils in food literacy modules.

#### 4. Foster school-family collaboration

- Create school-family nutrition pledges or shared goals around healthy eating.
- Organize regular parent workshops on healthy lunchboxes, local food systems, and interpreting labels.
- Develop “family challenge weeks” on themes such as water consumption, zero-waste snacks, or cooking with legumes.
- Establish home-school garden partnerships where students bring sustainability habits home.

#### 5. Promote real-life engagement through school and community initiatives

- Expand school garden programs and connect them to local farmers' markets, biodiversity projects, and health centers.
- Collaborate with municipal services and NGOs to implement broader public awareness campaigns rooted in school activity.
- Recognize students and schools as local leaders in food sustainability, amplifying impact beyond the classroom.

These actions will help build resilient and food-literate school ecosystems where knowledge is translated into lasting behaviors supported by teachers, reinforced by families, and sustained by the community.

Based on the findings from the comparative survey analysis, the following strategic recommendations are proposed to enhance teachers’ roles as catalysts for healthier, more sustainable school environments across Europe and beyond.

#### **Strengthen teacher training programs on practical nutrition and sustainability**

To ensure that teachers are fully equipped to deliver high-quality nutritional and sustainability education, it is essential to strengthen initial and ongoing teacher training programs.

Training should move beyond theoretical knowledge, emphasizing practical, actionable skills, including:

- Recognizing and teaching about macronutrients, energy balance, and hydration needs.
- Understanding sustainable food systems, food labeling, and environmental impacts of dietary choices.
- Utilizing interactive, experiential learning methods such as classroom cooking demonstrations, school garden activities, and eco-diet challenges.

Investment in certified nutrition and sustainability modules — integrated into professional development courses — would empower teachers to lead by example and embed these themes across the curriculum.

### **Encourage daily hydration and physical activity**

While theoretical knowledge about hydration and physical activity was widespread, practical adherence varied significantly.

Schools should implement structured initiatives to encourage healthier daily routines, including:

- Installing water fountains and providing reusable water bottles for students and staff.
- Incorporating hydration breaks into daily schedules.
- Establishing "active school" programs that integrate movement into academic lessons (e.g., "walk-and-talk" sessions, active recess, dance or yoga breaks).
- Promoting staff wellness programs that prioritize regular physical activity and mental health.

Such measures not only improve teachers' and students' personal health but also create vibrant, health-promoting school cultures.

### **Integrate food literacy across school curricula**

Food literacy — encompassing nutrition, sustainability, food systems, and consumer education — should be systematically embedded across multiple school subjects, including:

- Science (nutritional science, ecosystems, environmental impacts of food production).
- Civic Education (food rights, food security, social justice in agriculture).
- Geography (global food systems, local vs. global food trade, climate impacts).
- Economics (sustainable consumption, ethical food production).

Cross-disciplinary projects, thematic weeks, and interdisciplinary team teaching approaches could help students develop critical thinking skills around food choices, linking personal actions to global challenges.

### **Foster community-based initiatives like school gardens and farmers' markets**

To transform theoretical knowledge into daily practice, it is crucial to root learning experiences in real-life community contexts:

- Expand school garden programs where students and teachers grow seasonal vegetables, learn about soil health, biodiversity, and local food traditions.
- Partner with local farmers, cooperatives, and ecological associations to create farmers' markets on school grounds or organize farm visits.
- Organize community food festivals celebrating traditional, local, and sustainable foods, fostering a sense of pride and ownership over healthy eating practices.

Such community-based projects foster experiential learning, intergenerational knowledge exchange, and stronger connections between schools, families, and local food economies.

## 7. CONCLUSION

The GARDENS Comparative Report highlights the essential role that schools, and in particular their educators and learners, play in transforming food culture from the ground up. Teachers are not only transmitters of curriculum content but are role models who shape how nutrition, sustainability, and wellness are perceived and practiced in everyday life.

With this report, it becomes equally clear that students themselves are powerful change-makers. When equipped with food literacy, practical tools, and opportunities for engagement, they can influence their families, inspire their peers, and bring meaningful innovation to school communities.

Furthermore, the integration of families as active partners in nutrition and sustainability education is key to reinforcing positive habits outside of school. When schools, students, and families work together, the impact multiplies — extending far beyond classroom walls.

For a sustainable and health-conscious future, we must continue to build an educational ecosystem where:

- Teachers are trained and supported
- Students are empowered through knowledge and action
- Families are engaged as allies
- Communities embrace schools as hubs for ecological well-being

This collective, intergenerational approach is the true strength of the GARDENS project, planting the seeds for lifelong change in both people and the planet.

The findings of the GARDENS project's comparative survey make it unequivocally clear: teachers are pivotal agents of change in promoting healthier eating habits, sustainable food choices, and active lifestyles among young generations.

Their influence extends far beyond formal instruction — teachers shape norms,

behaviors, and cultural expectations through their daily actions, classroom practices, and interactions with students and families.

Across all five participating countries — Italy, Guadeloupe, Serbia, Germany, and Cyprus — teachers demonstrated a commendable level of general awareness regarding nutrition, hydration, physical activity, and sustainability.

However, significant gaps in detailed knowledge, practical application, and systematic integration into educational practices were also revealed.

Investing in the education and capacity building of teachers is therefore not simply an accessory action — it is an essential, strategic priority for achieving long-term, systemic cultural change toward healthier and more sustainable living.

Professional development programs, practical toolkits, interdisciplinary curricular reforms, and school-community partnerships must be designed to support teachers as leaders, role models, and multipliers of positive change.

If appropriately empowered, teachers have the potential to:

- Inspire students to make informed, conscious food choices.
- Normalize physical activity and hydration as integral parts of daily life.
- Build a generation that connects personal health to planetary health.
- Create resilient, health-promoting school environments deeply rooted in local cultures and global responsibilities.

In an era where climate change, chronic diseases, and food insecurity pose interconnected global challenges, the mission of GARDENS resonates with renewed urgency:

to cultivate not just knowledge, but values, skills, and habits that will nurture eco-healthy, sustainable, and thriving communities across Europe and beyond.

## 8. GRAPHICAL SUMMARIES

In order to complement and reinforce the comparative analysis presented throughout this report, a series of graphical summaries were generated.

These charts provide a visual snapshot of the key findings, highlighting strengths, gaps, and comparative trends across the five participating countries: Italy, Guadeloupe, Serbia, Germany, and Cyprus.

Visual data representation offers an immediate and intuitive understanding of:

- Nutritional knowledge disparities
- Sustainability awareness levels
- Hydration habits
- Physical activity practices
- Food label literacy rates

Through these graphs, readers can quickly appreciate both common patterns and country-specific differences, making it easier to identify priority areas for intervention and potential best practices to share across borders.

The charts below illustrate:

- Nutrition Knowledge by Country

Level of understanding of macronutrients, energy sources, and portion sizes.

- Sustainability Awareness by Country

Awareness of the environmental impact of food choices and familiarity with sustainable diet principles.

- Hydration Awareness and Water Intake



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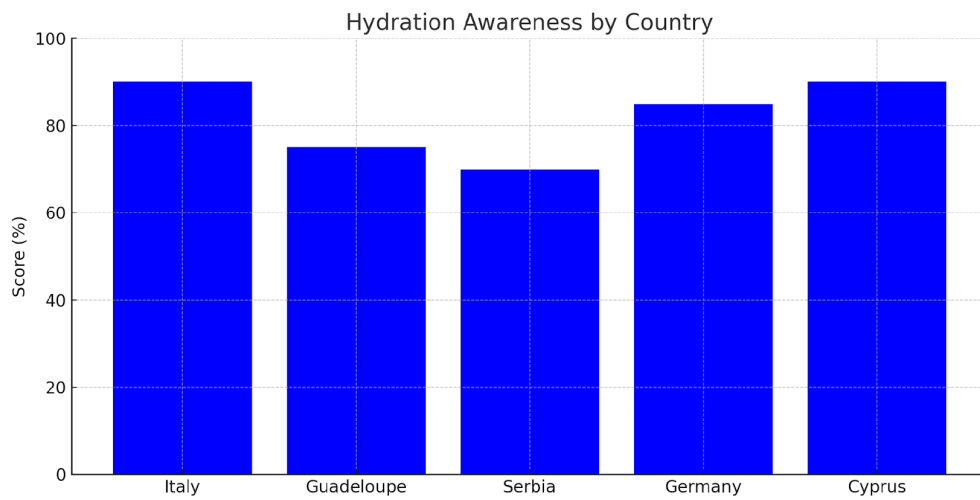
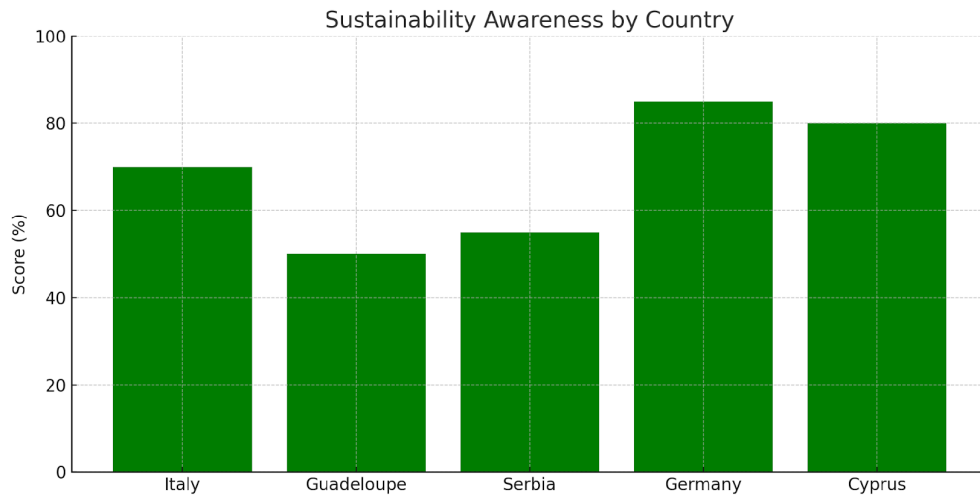
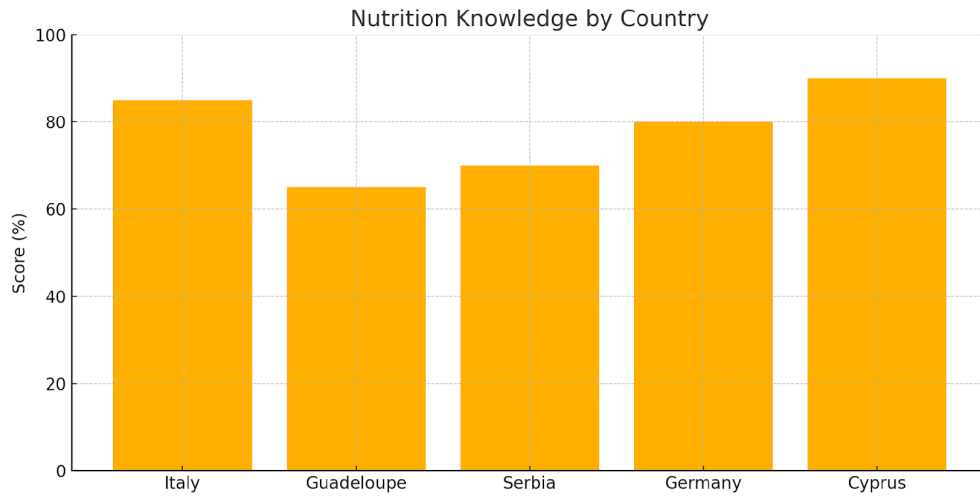
Recognition of hydration importance and actual water consumption behaviors.

- Physical Activity Engagement

Frequency of teachers' personal involvement in regular physical activities.

- Food Label Literacy

Percentage of teachers who habitually read and understand food labels, including nutritional panels and sustainability certifications.



## Final thoughts: toward a healthier and more sustainable future

### Student food literacy comparative table

Country	Nutrition Knowledge (%)	Macronutrient Knowledge (%)	Hydration Awareness (%)	Sustainability Awareness (%)	Label Reading (%)
Italy	70.6	27.5	92	51.7	45
Germany	68	40	90	78	60
Cyprus	65	35	85	60	38
Serbia	50	22	70	30	20
Guadeloupe	48	20	65	25	15

The table below summarizes key indicators from the student survey across all participating countries. It highlights the percentage of students demonstrating knowledge in nutrition, macronutrients, hydration, sustainability, and food label reading. Germany consistently performs well across categories, while Serbia and Guadeloupe show lower levels of awareness and understanding, especially in food label literacy and sustainability-related topics. Italy and Cyprus demonstrate strong hydration awareness and basic nutrition knowledge, but still require improvement in applied macronutrient understanding.

## Executive Summary

### *Comparative Analysis Report – GARDENS Project*

This report presents a comprehensive comparative analysis of nutritional knowledge, dietary habits, sustainability awareness, and lifestyle behaviors among teachers and students from five participating countries in the Erasmus+ GARDENS project: Italy, Guadeloupe (France), Serbia, Germany, and Cyprus.

Based on standardized surveys administered across primary and lower secondary schools, the report evaluates key indicators related to food literacy, hydration, physical activity, macronutrient understanding, and sustainable consumption practices.

#### **Key findings:**

- Teachers showed high awareness of healthy eating principles, especially in Italy, Germany, and Cyprus. However, practical application of knowledge (e.g., portion sizes, sustainability integration) remains uneven across contexts.
- Students demonstrated a good general understanding of fruits and vegetables but significant misconceptions around macronutrients, energy sources, and food processing.
- Sustainability awareness was most advanced in Germany and Cyprus, while it remains limited in Guadeloupe and Serbia.
- Food label literacy is an emerging gap for both teachers and students, particularly outside Germany and Italy.
- Hydration habits and physical activity were recognized as essential but not consistently practiced, especially among students in Guadeloupe and Serbia.

### **Strategic recommendations**

The report proposes the following cross-cutting actions:

- Strengthen teacher and student training on practical nutrition and sustainability.
- Integrate food literacy and label reading into school curricula across disciplines.
- Promote school–family partnerships through shared challenges, workshops, and garden projects.
- Support hydration and physical activity with structured programs and infrastructure.
- Encourage community-based engagement through school gardens and local food networks.

### **Final reflection**

The GARDENS project confirms the critical role of schools in cultivating eco-healthy attitudes. Teachers serve as anchors of knowledge, students as drivers of change, and families as allies in sustainability.

Together, they form a community capable of advancing food education and climate-resilient lifestyles across Europe and beyond.



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