SO WHAT?
POLICY BRIEF N° 23 • SEPTEMBER 2022
www.chaireunesco-adm.com

UNESCO Chair in World Food Systems

The UNESCO Chair in World Food Systems breaks down the barriers of knowledge on food. The So What? collection translates the results of research into straightforward conclusions for action.

More vegetarian meals in school canteens to reconcile nutritional quality and environmental protection in France

Nicole Darmon, INRAE, UMR MoISA, Montpellier, France
Romane Poinsot, MS-Nutrition, Marseille, France
Florent Vieux, MS-Nutrition, Marseille, France

KEY POINTS

- Current French school catering regulations require at least one unground red meat meal and one vegetarian meal to be served every week.
- In school meals, the choice of the dish to serve as a "protein dish" has a strong influence on the environmental impact of the meal and little influence on its nutritional quality. Meals with a vegetarian "protein dish" have a significantly less detrimental environmental impact than those with a fish- or meat-based "protein dish".
- Serving 12 vegetarian meals out of a total of 20 meals (instead of 4 or 5, the minimum required by current regulations) and alternating meat and fish with vegetarian "protein dishes" would significantly reduce environmental impacts (25 to 50% reduction in greenhouse gas emissions in particular) while also maintaining good nutritional quality.

Reviewing the regulation on nutrition in school canteens: what role should vegetarian meals play?

In mainland France, approximately 8.5 million children eat lunch in school canteens every week. The composition of these meals is subject to the rules provided by Decree no. 2011-1227 of 30 September 2011 "on the nutritional quality of meals served in school canteens". Meals served to children must thus include 4 or 5 components (starter and/or dessert, "protein" dish, side dish, dairy product). They must also meet frequency standards set for each type of dish. This frequency is defined for a set of 20 successive meals. The types of dishes are themselves defined in terms of 1) the component concerned (e.g. starter), 2) the proportion of certain food categories (e.g. vegetables), 3) certain nutrient contents (e.g. fats, calcium), and 4) other characteristics such as raw/cooked, unground/ground, etc.

All these parameters (rules, associated frequency) form a "frequency rule". Nothing is prohibited. However, serving certain dishes is encouraged by a minimum frequency. For example, raw vegetable or fruit starters must be served at least 10 times out of 20. Conversely, serving other dishes is limited by a maximum frequency. This is the case, for example, for starters containing more than 15% fat, which must be offered less than 4 times out of 20. All in all, the regulation requires that 15 frequency rules be met for every set of 20 successive meals.

The application of all these rules ensures the high nutritional quality of the meals served in primary schools. These meals cover nearly half of the recommended daily amounts of protective nutrients (fibre, vitamins, minerals, etc.) and almost a third of children's daily energy needs (Vieux *et al.*, 2019).

Organisation des Nations Unies pour l'éducation, la science et la culture
Chaire Unesco en alimentations du monde France
L'INSTITUT agro Montpellier
cirad
With the support of Carasso Daniel & Nina

The role of school catering beyond nutritional quality

School catering has a major role to play in tackling a large number of issues: nutritional and health issues of course, but also educational, cultural, economic, and environmental issues. It helps to develop children's palates and raises their awareness of balanced eating habits; it teaches them togetherness and introduces them to culinary culture; and it encourages them to prevent waste and protect the environment.

It can also facilitate the transition towards more sustainable food systems, by subsidizing the meals, developing local supply chains, serving food with a lesser environmental impact, etc. The "EGalim" law, passed in 2018, has enabled change in this direction, particularly by requiring that vegetarian meals—in other words meals without meat or fish—be served at least once a week (i.e. 4 to 5 meals out of 20). This provision, initially introduced on an experimental basis, was made permanent by the 2021 "Climate and Resilience" law. Moreover, the national institutional catering council (CNRC, *Conseil national de la restauration collective*) recommends 5 frequency rules specific to vegetarian dishes. This particularly includes the requirement that no more than 1 in 5 vegetarian dishes be an "industrially processed plant-protein dish". Serving a variety of vegetarian dishes ensures a diverse nutritional intake (Poinsot *et al.*, 2020). The composition of school meals is thus subject to a total of 20 frequency rules: the 15 general rules imposed by the 2011 decree, and the 5 rules recommended by the CNRC, specific to serving vegetarian dishes.

The drive for more sustainable school catering enshrined in the "EGalim" law may however conflict with some of the frequency rules still imposed by the 2011 regulation. For example, serving "unground beef, veal, lamb and offal" (i.e. ruminant meat, also called "red meat") is encouraged by a minimum frequency of 4 times out of 20. Conversely, serving "protein dishes" containing small amounts of meat/egg/fish (less than 70% of the serving size) is discouraged by a maximum frequency of 4 times out of 20. These frequency rules were originally intended to limit the serving of industrially processed meat-based products of poor nutritional quality (e.g. fatty meatballs), and they have succeeded in this regard. However, they are now problematic given the recognized negative health and environmental impacts of excessive red meat consumption. Furthermore, discouraging the serving of dishes that only contain small amounts of animal products may seem inconsistent with the "EGalim" law, which encourages serving vegetarian meals.

A review of school catering regulations therefore appears to be necessary. This has been entrusted to the CNRC, which is due to deliver its findings in autumn 2022. In order to inform public decision making, research has been carried out to identify the best compromise between nutrition and environmental protection, by simulating several scenarios for changing the regulations on the composition of school meals (Poinsot *et al.*, 2022a).

METHODOLOGY

This study[1] was conducted in close collaboration with a group of professionals and researchers (the EnScol group). A database was built from the data sheets of 2,316 dishes served in several primary schools in mainland France (Poinsot *et al.*, 2022b). This database includes: 1) the serving size for each dish; 2) the dishes' nutritional composition based on the Anses CIQUAL food composition table[2]; and 3) their environmental impacts (greenhouse gas (GHG) emissions, acidification of terrestrial and freshwater ecosystems, water use, use of fossil resources, freshwater and marine eutrophication, and land use).

A total of 18 scenarios of change to the rules governing the composition of school meals were simulated, by activating 4 levers relating to the composition of meals, alone or in combination: 1) the number of meal components (4 or 5); 2) compliance with the 20 frequency rules (yes or no); 3) the frequency of vegetarian meals (0, 4, 8, 12, 16 or 20 meals out of 20); and 4) the replacement of the rule imposing that 4 meals with unground red meat be served with a rule requiring either that 4 meals with white meat (pork or poultry) be served, or that 4 meals with different meats (lamb, beef, poultry, pork)[3] be served. For each scenario, 100 sets of 20 successive meals were generated. In total, 36,000 meals were generated, 32,000 of which were five-component meals.

The sets of 20 meals generated under the different scenarios were compared with one another and with a reference scenario. Their nutritional quality was assessed by calculating their average mean adequacy ratio (MAR) for 2,000 kcal, and their environmental impact was estimated using several life cycle assessment (LCA) indicators from the Agribalyse database[4]. The scenario comprised of 20 five-component meals which met the 20 frequency rules and included 4 vegetarian meals was defined as the reference scenario. Its MAR score was 95%.

The 32,000 five-component meals generated by these scenarios were organized into categories based on the type of "protein dish" they contained (lamb, beef, pork, fish, poultry, vegetarian with cheese, vegetarian with egg and/or a non-cheese dairy product, vegan). This made it possible to compare their nutritional quality and their average environmental impacts.

1. Study available online: https://rdcu.be/cJM80

2. National Food Safety Agency (*Agence nationale de sécurité sanitaire de l'alimentation*). The CIQUAL database is available here: ciqual.anses.fr

3. The latter scenario was created specifically for this publication.

4. agribalyse.ademe.fr

Figure 1. Average environmental impacts and mean adequacy ratio (MAR) of a five-component meal, by type of "protein dish".

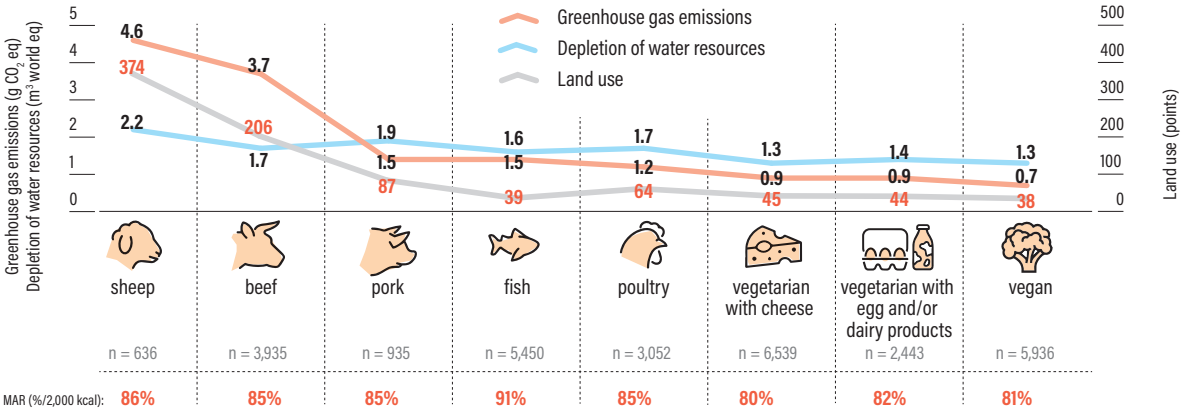
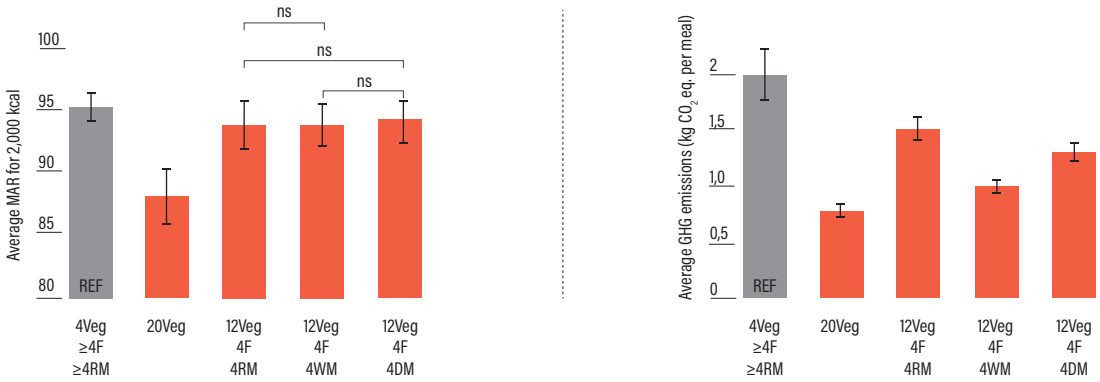


Figure 2. Mean adequacy ratio (MAR) and greenhouse gas (GHG) emissions of the meals included in the 20-meal sets (n = 100 sets per scenario) generated, for a selection of 5 of the 18 scenarios tested



Reading note: "REF 4Veg 4F 4RM": reference scenario, i.e. 4 vegetarian meals, 4 meals with fish, and 4 meals with red meat; "20Veg": 20 vegetarian meals; "12Veg 4F 4RM": 12 vegetarian meals, 4 meals with fish, and 4 meals with red meat; "12Veg 4F 4WM": 12 vegetarian meals, 4 meals with fish, and 4 meals with white meat; "12Veg 4F 4DM": 12 vegetarian meals, 4 meals with fish, and 4 meals with meat from different types of animals.

The MAR and the GHG emissions were compared using the Student t-test. All differences between the scenarios are significant except for those signalled as "ns".

Reconciling nutritional quality and environmental protection

Analysis at meal level shows that the type of "protein dish" chosen has a significant influence on the environment, particularly on GHG emissions, and relatively little influence on nutritional quality. Meals containing sheep or beef have the highest environmental impact, whereas those without meat or fish have the lowest (Figure 1).

Analysis of the 20-meal sets shows that serving 4 components instead of 5 (the first lever tested) would result in insufficient meal energy content for some children, such that serving sizes would have to be increased. The results presented in Figure 2 also show that:

- Compared to the reference scenario, making all 20 meals vegetarian would reduce environmental impacts (with a 61% reduction in GHG emissions in particular) but would also reduce the meals' nutritional quality (MAR = 88%);
- Serving 12 vegetarian meals, 4 meals with fish, and 4 meals with unground red meat—in line with current regulation—would reduce environmental impacts (with a 25% reduction in GHG emissions in particular) while maintaining good nutritional quality (MAR = 94%);
- Serving 12 vegetarian meals, 4 meals with fish, and 4 meals with white meat—which does not align with current regulation—would result in a greater reduction of environmental impacts (with a 50% reduction in GHG emissions in particular) while maintaining good nutritional quality (MAR = 94%);
- Serving 12 vegetarian meals, 4 meals with fish, and 4 meals with different types of meat—which does not align with current regulation—would have an environmental impact halfway between those of the two previous scenarios (35% reduction in GHG emissions) while maintaining equally good nutritional quality (MAR = 94%).

Of all the environmental impacts studied, only water use does not follow the same trends as GHG emissions, and is less influenced by the type of "protein dish" chosen (Figure 1) and the different scenarios.

Limits to overcome

A first limitation of this study is that it follows a theoretical approach. It does not account for certain realities on the ground, such as waste and its impact on children's nutritional intake, the economic capacity to implement the meal sets generated, the suitability of the combinations of dishes in terms of taste, their technical feasibility, etc.

A second limitation relates to the imperfect nature of the data used. The LCA values provided by the Agribalyse database do not reflect the full environmental performance of foods and ingredients. In particular, these LCAs do not take into account the potentially beneficial aspects of ruminant farming, such as its role in maintaining grasslands, or the ecosystem services that the latter provide. Likewise, this environmental assessment does not account for the fact that pig and poultry farming competes with the supply of food for humans, as these animals are fed plant products that could be consumed by humans, which is not so much the case for grass-fed cattle. This is why the scenario including meat from different types of animals was tested. Moreover, if 12 vegetarian meals and 4 meals with fish are served, it seems logical to allow a range of different meats to be served in the remaining 4 meals, which requires modifying the frequency rule that imposes 4 meals with unground red meat.

The results of a recent study by the Anses (Anses, 2021) indicated that systematically replacing existing lunch meals with vegetarian meals in the average diet of children living in mainland France would not affect the meals' performance as regards nutrient intake recommendations. This study concluded that "*it is therefore not relevant to set a maximum frequency of meat- or fish-free menus*" in school catering. However, since the Anses simulation was based on children's average consumption, it does not allow for assessing the nutritional impact that fully eliminating meat and fish in schools would have on many children whose diet at home is unbalanced, particularly for financial reasons. Focusing on the intrinsic nutritional quality of school catering, the study presented here observes that a frequency of 12 vegetarian meals out of 20 would better protect nutritional value than fully vegetarian catering.

CONCLUSION

To the authors' knowledge, this study is the only one to have jointly quantified the nutritional and environmental impacts of different scenarios for changing the frequency rules applied to school catering in France. The scenario with 20 meals comprised of 12 vegetarian meals, 4 meals with fish and 4 meals with meat from different types of animals could provide a good compromise between nutritional quality and environmental protection. By including a diverse range of meats, this scenario aligns with the precautionary principle, given the controversies surrounding the environmental superiority of monogastric meat production (poultry, pork) compared to beef production. From a nutritional standpoint, it is important to remember that reducing meat consumption will only truly be beneficial if it is replaced by a diverse range of plant products with good nutritional density (we should note that in the study this diversity was ensured through compliance with frequency rules). However, this scenario does not comply with the current regulations; their review by the CNRC is therefore keenly awaited.

References

Vieux F., Dubois C., Duchêne C., Darmon N. 2019. Implications nutritionnelles des directives françaises sur l'offre alimentaire en restauration scolaire et place des plats protidiques. *Cahiers de Nutrition et de Diététique*, 54(1), 22-34.

Poinsot R., *et al.* on behalf of the EnScol network. 2020. Nutritional quality of vegetarian and non-vegetarian dishes at school: are nutrient profiling systems sufficiently informative? *Nutrients*, 12, 2256.

Poinsot R., Vieux F., Maillot M., Darmon N. 2022a. Number of meal components, nutritional guidelines, vegetarian meals, avoiding ruminant meat: what is the best trade-off for improving school meal sustainability? *European Journal of Nutrition*, 61, 3003-3018.

Poinsot R., *at al.* Collectif Enscol, 2022b. Composition nutritionnelle et impacts environnementaux de plats servis en restauration scolaire en France, https://doi.org/10.15454/YRD4JC, Recherche Data Gouv, V1.

Anses. 2021. *Rapport d'appui scientifique et technique relatif aux fréquences alimentaires recommandées en restauration scolaire dans le cadre de l'expérimentation du menu végétarien (saisine 2020-SA-0101).* Maisons-Alfort : Anses, 47 p.

Authors

Nicole Darmon, Research Director, INRAE, UMR MoISA, Montpellier, France.

Romane Poinsot, research engineer in nutrition and food sciences, MS-Nutrition, Marseille, France.

Florent Vieux, co-founder and researcher at MS-Nutrition, Marseille, France.

ISSN 2680-1329