

What is the target for running a scenario?

The goal for any scenario of the global food system should be to meet the recommended daily intake (RDI) for all nutrients in the DELTA model, shown as the black bar on the nutrient supply charts. The only exception is vitamin D, which can be naturally synthesized with the exposure to sunlight, so is not required from the diet.

The DELTA model assumes even distribution of food commodities among the global population. In reality, food is not evenly distributed globally. In addition, adverse events such as droughts or floods can affect food production and distribution. Therefore, to account for this, nutrient supply per person per day should be slightly above the RDI.

What does food waste include?

Supply chain waste represents losses that occur from farmgate to retail. In-home waste is food waste that occurs in home by consumers. Inedible material in food used (e.g. inedible fruit and vegetable material skins) is not included in food waste; the DELTA model factors this inedible portion automatically. Any mass that does not leave the farm is not counted as food supply, so cereal stalks and husks that are left behind are not included as food waste.

What does food production include?

Food production in the DELTA model includes all biomass that leaves the world's farms that enters the food system. Some of this will go to human consumption, while some will be used as animal feed or for other uses, and some will be wasted. Synthetic or non-food sources of nutrition (e.g. fermentation produced protein and mined minerals) are not included.

Does nutrient provision account for losses of bioavailability during cooking?

No. The model assumes that all bioavailable nutrition in food consumed is as it would be in raw form. The reality is that food can be prepared and consumed in many different ways, affecting nutrient composition and bioavailability. However, the complexity of modelling this would bring a significant margin of error into the model. Therefore, the DELTA model assumes that all bioavailable nutrients in the raw commodity ends up in the food consumed. Since in reality this is not the case, the model slightly over-states the nutrition provision.

Does the model run optimisations to generate one right answer?

The purpose of the DELTA model is to not be constrained to one perfect answer, but rather to generate scenarios about possible food production scenarios, in order to generate informed discussion and expand thinking. As such, the model does not calculate one right answer.

Are environmental footprints included in the DELTA model?

Not at this stage. Environmental sustainability is a key part of a sustainable food system, and as such resource footprints (greenhouse gas, land and water) should be considered when evaluating future possible food systems. However, the currently available footprinting information has issues including data availability, system boundary definitions and allocation between co-products. Therefore, environmental footprints cannot accurately be estimated in the DELTA model currently. This presents an opportunity to close some of the information gaps through development of additional life cycle analyses.

Can input data be selected by country?

No. The DELTA model looks at the world feeding the world. Looking at one country in particular is not possible due to global trade of food. Comparing production with nutrition requirements in one specific country is not suitable, as this does not account for imports and exports.

How is transport/supply chain to get food from production to mouth factored?

The DELTA model uses FAO food balance sheets, which encompass the entire supply chain, capturing losses and distribution into different uses. Since environmental footprints are not yet included in the model due to data issues, this aspect of transport and supply chain is not yet included in the model. In fact, the complexity of the global supply chain is one of the main reasons why the life cycle analyses are not accurate and complete enough to include in the model.

Does the model address the uneven distribution of food and nutrients globally?

No. The focus of the DELTA model is on the global food production required to meet global nutrient requirements. When running various scenarios in the DELTA model, a slight over-production of all nutrients should be the target, to act as a buffer to account for the uneven distribution of food and nutrients globally.

What is the difference between global demand and nutrition required?

Demand is the quantity of food global consumers are willing and able to purchase. Nutrition required is based on the recommended daily intakes of each nutrient of the global population. For example, while demand may be increasing for protein, there is already sufficient protein based on nutrition required. In fact, some individuals would need a decrease in intake of protein, while others would need increases.

What is the difference between reference RDI adjustment and bioavailability adjustment?

The reference RDI changes as the selected diet changes between base, vegetarian and vegan. This increases RDIs of iron and zinc to account for lower bioavailability of these minerals from plant sources compared to animal sources. Because there is not sufficient data on how bioavailability truly affects the supply of these nutrients, the RDI increases to account for the fact that more iron intake is required to meet body requirements in a vegan or vegetarian diet compared to an omnivorous diet. On the other hand, there is sufficient scientific data on the bioavailable supply of essential amino acids from different protein sources. The bioavailability adjustment factors this into the model.

How were the default scenarios created?

The default scenarios (e.g. 2030 Vegetarian, 2030 Scale-up Current) are rough estimates of what the given scenario might look like in terms of food production. These are intended as starting points for the user to explore from, rather than predictions based on food system forecasts. For example, the 2030 Vegetarian scenario runs the DELTA model with meat and seafood products removed, while dairy and plant foods are increased. This represents a possible food system scenario that the user can then adjust to explore nutritional outcomes.

Does the DELTA model dictate an individual diet?

No. The purpose of the DELTA model is to explore the ability of different food production scenarios to provide the bioavailable nutrients needed to adequately feed the global population. It does not try to provide the answer to the perfect sustainable diet for individuals. Individuals have a lot more choice in their diet, particularly those with wealth.

How do I use the Nutrient Density tool to identify which foods to build up in the food system?

To build an efficient food system it is useful to start with nutrient-rich foods, particularly those rich in limiting nutrients. The nutrient density chart is a great tool to discover which foods are rich in nutrients. These foods should be added into the food system to ensure nutrient requirements are met, without generating an unnecessary surplus of energy and macro-nutrients.

By navigating to 'Helpful' and selecting 'Nutrient Density', two charts will appear side by side. The nutrient density chart is on the left, and a chart showing food use of the item is on the right. The purpose of the food usage chart is to help identify which foods are realistically able to contribute to nutrient supply. Foods that have high nutrient density, and also relatively high food use have good potential to contribute to global provision of that nutrient in a practical food system.

The target nutrient can be changed to view the nutrient of interest using the drop-down box. This nutrient can then be constrained against a number of different parameters. Mass is the default dietary constraint, but this can be changed depending on what the limiting factor is in the scenario. Finally, the number of items viewed can be chosen using the slider.

Are synthetic nutrients included in the DELTA model?

No. Synthetic nutrients, such as fermentation produced protein or mined minerals, are not a material contributor to the global food system. To include synthetic nutrients, accurate data is required on the amount of biomass required to obtain a certain amount of protein (e.g. sugar required to produce protein via fermentation).

What does the Nutrient Contribution Score mean?

The Nutrition Contribution Score is a metric to give a sense of how valuable each food item is in terms of its nutritional contribution to the consumer. The DELTA model calculates this score for each food item by taking the proportion of each nutrient (e.g. Calcium, Vitamin A) supplied by the food item (e.g. Apples, Bananas), and then summing these for all nutrients. Energy and carbohydrates are excluded from the calculation, as a high contribution to these values is not necessarily beneficial to the global population.

What does the Supply: Balance Sheet tab show?

The Supply Balance tab shows what happens to each of the 15 food groups input by the user as it passes along the food supply chain. The display charts are best explained through the example of sugar.

Sugar originates from sugar cane and sugar beet, which is what is represented by the production value for Sugar input by the user in the Scenario Editor. This is the raw material at Stage 1 of the supply chain in the Supply Balance chart for sugar. The majority of this material is allocated to Other Uses (e.g. biofuel production) and Processing (i.e. conversion to raw sugar). This raw sugar is the raw material at Stage 2 of the supply chain. This raw sugar is mainly split between Food, Waste and further Other Uses (industrial products such as non-food alcohols). The only product of sugar at Stage 3 of the supply chain is Alcohol, as such there is only a small fraction of the total sugar that goes to Processing between Stages 2 and 3.