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New Seed: Evaluation of Cost-Effectiveness

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AUTHORS

Rory Todd - Researcher

Jerome Mayaud - Senior Research Manager

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For all queries, please contact ghd@rethinkpriorities.org.

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RETHINK PRIORITIES
530 Divisadero St. PMB #796
San Francisco, California 94117
United States of America

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Editorial Note

This report was produced by the Global Health and Development Department of Rethink Priorities in September 2026. The project was commissioned by New Seed, which does not necessarily endorse our conclusions.

The report reviews New Seed's cost-effectiveness analysis of its biofortified quality-protein maize programmes in Guatemala and El Salvador, covering the period 2021–2029, with particular focus on 2026–2029. We conducted a deep dive on the causal chain from protein quality to child growth and stunting, and from stunting to mortality and disability. We then reviewed the remainder of the model, including seed production and farmer adoption projections, yield assumptions, farmer economic impacts, nutrient intake, and programme costs and government co-financing.

Our final deliverable is a modified cost-effectiveness model incorporating the changes we recommend. We report results using traditional global health measures (cost per DALY averted and benefit–cost ratios), GiveWell-style units of value under both standard and Livelihoods programme moral weights, and a societal accounting that also counts government subsidy spending. We flag major sources of uncertainty throughout, and present pessimistic and optimistic bounds alongside central estimates. We remain open to revising our views given new evidence.

Executive summary

New Seed develops high-yielding, high-nutrition maize seeds; supports seed companies to produce them; and (with partners) subsidizes and donates seeds to farmers. Rethink Priorities conducted a review of New Seed's cost-effectiveness analysis (CEA) for their operations in Guatemala and El Salvador over the period 2021–2029, with specific focus on 2026–2029.

During our analysis, we conducted a deep dive on the impact chain from protein quality to child growth and stunting, and from stunting to health impacts. We then reviewed New Seed's existing model in detail, researching the evidence behind key parameters.[1] As part of this, we interviewed one expert on stunting (CGD, 2023) and exchanged communications with three others (Joanne Arsenault, Jason Donovan, and Meliza Peña).[2]

As a final deliverable, we produced a modified CEA based on our suggested changes. We consider this to be our take on New Seed's cost-effectiveness at the time of writing.

Modifications to the CEA

Full modifications and their justification are provided in the respective sections of this report. We list each one and the direction of its influence on results below. We also included low and high bounds for estimates. For instances where we modify the low or high bound but do not modify the central estimate, we do not list them here.

Protein quality to stunting and averted health burden

- We included trends for stunting prevalence and (age-group specific) population size. This had a modest downwards effect on impacts.
- We placed a 30% discount on the estimate for the impact of protein quality maize on child growth. This had a very modest upwards effect on impacts, as New Seed already included a similar discount.
- We modified New Seed's "alternative" approach to estimating DALY impacts from stunting to make it country-specific and to use the disability burden estimated by the Global Burden of Disease (GBD) study. This had an upwards impact on the standard approach but a downwards impact on the alternative approach.

Farmer adoption and economic impacts

- We included a discount on projected growth of seed sales and donations, which we considered optimistic. This had a significant downwards effect on impacts, with a more modest downwards effect on costs.
- We included a discount on the delta between yields of New Seed's seeds and counterfactual seeds (those that farmers would have used in the absence of New Seed). This had a moderate downwards effect on impacts.

[1] **AI use:** We drew partly on Claude (primarily the Opus 5 model) for our review. This involved asking Claude to separately search for potential issues with New Seed's CEA (besides our own review), as well as identifying relevant evidence (although in some cases we also used manual web searches) to inform our take on key issues. We reviewed all statements made by Claude before factoring them into our takes or modifications.

[2] We reached out to several more experts on stunting and cost-effectiveness analysis for nutrition, but we did not receive replies except for one (Chloe Puett), who was not available in the required timeframe.

- We included an adjustment for post-harvest losses for the estimate of maize production used to calculate farmer revenue. This had a modest effect on impacts.
- We reported GiveWell valuations using both their standard moral weights and, separately, one for a "livelihood program weight," based on their recent announcement (GiveWell, 2025). For the livelihood program weight, we also included income increases via nutrition. This had a significant downwards effect on standard reporting results, but a significant upwards effect on results for the livelihood program weight reporting.

Nutrient intake and impacts

- We assume smaller losses of iron and zinc content from milling. This had a moderate upwards effect on impacts.
- We included a multiplier for resource sharing within households for the iron impacts on income. This had a moderate upwards effect on impacts.

Costs

- We implemented a way for costs of bag sales and donations to depend on their volume. This should have a moderate downwards effect on impacts, as we separately apply a negative adjustment to the volume of sales and donations.
- We adjusted the counterfactual attribution of benefits downwards by 11%, attributing 89% of estimated benefits to New Seed. This downwardly impacted cost-effectiveness results.
- We used a uniform 4% discount rate across all costs and benefits, removing the 4.3% rate New Seed had previously used for some reporting. This increased cost-effectiveness.

Cost-effectiveness

We estimate that New Seed's programs in Guatemala and El Salvador averted 8,963 and 3,312 DALYs respectively, with a modeled monetary value of $198M and $122M respectively, over the period 2021–2029.

Measured against core operational costs, we estimate a standard cost-effectiveness of $2,977 per DALY averted and a benefit-cost ratio (BCR) of 8.7 over 2021–2029, improving to $1,573 per DALY averted and BCR of 17.2 over 2026–2029 as the programs reach scale.

On the basis of GiveWell's framework, the programs return 2.4x GiveWell's cash-transfer benchmark over 2021–2029 and 4.6x over 2026–2029 under standard moral weights and excluding long-term investment costs. Under the weights GiveWell applies to its livelihoods program, which value income gains twice as highly, these rise to 4.6x and 8.7x the benchmark for 2021–2029 and 2026–2029, respectively.

Therefore, the most optimistic scenario (central estimate under livelihood program weights for 2026–2029) sits above GiveWell's 6x funding bar, although we caveat that these doubled weights apply only to GiveWell's Livelihood Program, which makes up only a share of their total portfolio. Including long-term investment costs in the denominator lowers these figures to 3.8x and 6x, respectively. A societal accounting method that also counts government subsidy spending (but not long-term investment costs) gives 3.9x over 2021–2029, and 5.6x over 2026–2029.

Deep dive on impact of quality protein maize on stunting and averted burden

In this section, we evaluate New Seed's existing approach to estimating impacts from consumption of the higher quality protein content in its biofortified maize on child growth and stunting, and consequent impacts on mortality and disability.

We present our preferred modifications to this approach at each point.[3]

Impact of quality protein maize on child growth and stunting

We conducted an in-depth review of how consumption of New Seed's biofortified maize impacts child growth through consumption of higher quality proteins. Below, we first examine the approach used in the CEA produced by New Seed, and then review the wider evidence base on the impact of quality protein maize (QPM) on child growth.

Examination of existing approach in New Seed CEA

Our analysis identified several modeling choices that could downwardly or upwardly bias estimates of impact. We list these in turn, along with suggested modifications.

We note the following assumptions in New Seed's existing model that could **bias estimates of impact downwards:**

- **New Seed does not include an impact of protein quality on wasting (only child growth).** Supporting this, a recent paper by Manary et al. (2024) concluded that Digestible Indispensable Amino Acid Score (DIAAS) and other measures of protein quality did "not reliably predict weight gain" in two large clinical feeding trials. Kasey Markel (New Seed) also told us that the influence on final estimates of impact from this pathway was modest. We therefore agree with not including this impact pathway.
- **New Seed caps adjustments to the estimate for growth gains from Gunaratna et al. (2010) at 1, meaning that the rate of growth cannot be larger than that estimated by Gunaratna et al. (2010).** This is despite New Seed's maize varieties likely having a higher DIAAS than the maize in the constituent studies underlying Gunaratna et al. (2010), reflecting higher protein quality. According to the FAO Food Balance Sheet, the populations of Guatemala and El Salvador also have a higher share of total energy intake from staples compared to the country populations of these studies, suggesting that consumers of New Seed maize receive more high-quality protein than individuals receiving the treatment in the constituent studies.
    - While potentially conservative, we think this is a reasonable approach, given the uncertainty in the DIAAS score for the maize in the Gunaratna et al. (2010) studies and uncertainty in maize as a share of total energy intake for the specific *samples* in the Gunaratna et al. (2010) studies. For our central and low estimates, we therefore make no modification here. For our high estimate, however, we remove this cap, acknowledging that the higher maize intake and DIAAS score

[3] We note that our modifications sometimes lean towards conservative where there is high uncertainty. We believe that conservatism is valuable as it counters general scepticism on the part of grantmakers and others in the EA community.

may drive higher rates of growth gain than that estimated in Gunaratna et al. (2010).

- **New Seed estimates that intake of higher quality protein from New Seed maize will increase growth rates of children for a total of 12 months.** This is based on the "upper limit of exposure" in the Gunaratna et al. (2010) studies: the longest duration for the constituent studies was 12 months. This is potentially conservative given that beneficiaries in this population were from 0 to 60 months old.
    - Inspecting the wider literature on how nutrition can impact stunting (rather than quality protein specifically), it shows mixed evidence on the time periods for increased growth rates. A supplementation study in Guatemala (Schroeder et al., 1995) showed impacts on length from 0 to 36 months, although the increased rate of growth declined with age. Another study (Walker et al., 1991) from Jamaica showed that effects on height only came in the first six months of supplementation. Overall, given the mixed evidence in adjacent studies and no evidence for QPM specifically, we think that the current assumption of 12 months of improved growth is reasonable. We have low confidence in this potentially important parameter, however, and assign 6 and 18 months to lower and upper bounds.

We note the following assumptions in New Seed's existing model that could **bias estimates of impact upwards:**

- **To estimate the total number of stunting cases averted, New Seed uses recent survey estimates of stunting prevalence, and assumes that these rates remain constant until 2050, implying no secular changes in stunting prevalence.** Guatemala and El Salvador show declining trends in Schneider et al. (2026), meaning the model is likely to overestimate stunting rates for later years, which will overestimate the percentage point drop in stunting caused by New Seed's maize. Lowering stunting rates in the future substantially reduces estimated impacts. We therefore believe that a stunting trend should be included in the model. After inspecting trends in stunting prevalence data, we concluded that a reasonable central estimate was a 5 percentage point per decade decline for Guatemala, with our low estimate using a 10 percentage point per decade decline and our high estimate assuming stagnation. El Salvador has reached 10% prevalence, at which point many countries in Schneider et al. (2026) plateau; we therefore did not include a trend here.
- **Constant values are also used for deficiency, mortality, and other burden estimates in the existing CEA.** The CEA justifies this by using a constant value for population as well (rather than rising populations, which will likely be the case across the countries New Seed plans to work in), which the source note argues should offset potential secular declines in burden estimates. We think that there are two issues here:
    - Population enters the model in more than one way. While holding population constant may underestimate beneficiaries from New Seed maize (e.g., the number of adults gaining benefits via increased iron intake are underestimated), it also results in underestimation of total maize in the food system, which is calculated using the constant value for population. This, in turn, results in overestimation of the projections for "Percent of maize in the food system that is biofortified," which feeds into the impact estimates for additional protein from biofortification. In fact, when populations are increased in the model for later

years, impact estimates **decrease**. This means that the assumption of constant population is not conservative but anti-conservative.
    - Secondly, the model also uses constant values for different age groups, effectively freezing the age structure. The countries which New Seed works in or plans to work in are mid-population transition, meaning that the age distribution of the population will likely shift upwards over time. Population projections for Guatemala and El Salvador show that while total population is forecast to increase, the population under 5 is forecast to *decrease*. Since a large share of overall estimated impacts come from stunting and other effects, which are only affected by nutrition at an early age, this frozen age structure will overestimate impacts.

We therefore use the (age-specific) medium-variant UN population projections to include age trends over time (UN, 2024). With more time, we would (a) add low and high variants to our uncertainty bounds, and (b) also add trends for other socio-demographic and economic parameters in the model, including life expectancy, GDP per capita, and household consumption.

We note the following assumptions generate **uncertainty in estimates of impact** with no clear direction of bias:

- **To calculate the extra height per month achieved through intake of the higher quality protein in New Seed's maize, New Seed multiplies a baseline height growth rate (0.82cm per month) by a parameter for the relative rate of growth**. This baseline rate of growth is estimated as the median across the constituent studies underlying Gunaratna et al. (2010). But New Seed's populations may have different baseline height growth rates compared to the samples in Gunaratna et al. (2010). If these are lower, this could potentially inflate extra height gains from New Seed's maize; if they are higher, the trend is reversed. Rates of stunting in Guatemala (Appendix B) are substantially higher than in the other countries underlying Gunaratna et al. (2010) (i.e., Ethiopia, Ghana, India, Mexico, and Nicaragua), while those in El Salvador are lower. However, given uncertainty in the correct specification for modeling improved growth rates, we parsimoniously choose to not make country-level adjustments here.
    - Katie Adams (New Seed) also pointed out that the baseline rates from the Gunaratna et al. (2010) studies are for children with age ranges up to 5 years, whereas the assumed period of accelerated growth is for younger children. Growth rates are higher (WHO, 2022) for younger children than for the rest of the under-5 period. Our sense is that any resulting underestimation from this is small, as the Gunaratna et al. (2010) studies do include several young cohorts. We therefore also do not make an upwards adjustment here, although note this may be conservative.

Relative increase in growth rate

To calculate the relative rate of growth for children consuming higher QPM compared to conventional maize, New Seed uses the lower confidence interval of Gunaratna et al. (2010) "to help account for potential meta-analysis bias in methodological choices, publication bias, etc.".

We used LLM-assisted searches and also spent an hour manually using Google Scholar search to identify other or more recent evidence on this parameter.[4]

Arsenault & Brown (2017) reconsider the Gunaratna et al. (2010) studies (and one other study) and conclude that the studies have several issues, including high attrition and poor reporting of treatment assignment, meaning that efficacy of QPM for child growth "remains uncertain."[5] A companion paper (Arsenault & Brown, 2017) argues that analysis of datasets shows, even among poor populations, "the prevalence of inadequate available protein intake decreased by age 9–12 mo and was very low in all sites (0–2%) after 12 mo of age…Inadequate protein intake in children <12 mo of age was due primarily to low energy intake from complementary foods, not inadequate protein density." While we think their conclusion that the Gunaratna et al. (2010) studies show a "lack of effect of additional protein on children's growth" is too strong, this does challenge the estimates in Gunaratna et al. (2010).

A large randomized controlled trial (Tessema et al., 2016) to measure impacts of QPM on child growth was registered in 2016, but no paper powered for these primary outcomes resulted from this. We have followed up with four of the researchers on the registered study, but received no reply.

Surveying the wider evidence for the impact of protein quality on stunting, Millward (2017) concludes that "height growth in children is sensitive to dietary protein and specifically dietary indispensable amino acids intakes…but…any influences are small and some of the evidence is indirect." He also points out that "dietary anabolic drive on linear growth is seriously compromised in the presence of inflammation, which appears to be widespread" globally.

Overall, we agree with New Seed that the *central estimate* from Gunaratna et al. (2010) requires a downwards adjustment to account for issues in the underlying evidence for this parameter. Their CEA currently assigns an effective 33% downwards adjustment by selecting the lower confidence interval from Gunaratna et al. (2010). We think that the magnitude of this adjustment is reasonable, although we prefer to be more explicit that this is a subjective haircut to account for bias, rather than accounting for statistical uncertainty (which the lower confidence interval captures). We therefore use the central estimate (selecting the upper and lower confidence intervals for our upper and lower bounds) but assign an explicit 30% downwards adjustment.[6] With more time, we would review the specific studies underlying Gunaratna et al. (2010) to inform this adjustment.

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[4] Our keyword searches combined: "protein quality" OR "protein quality maize" AND "stunting" OR "child growth."

[5] Their description of issues is as follows: "Of the 6 studies, only 1 conducted a longitudinal analysis of growth controlling for baseline status, and that study did not find an impact on changes in length-for-age Z score or weight-for-age Z score after 1 year. Only 2 of the studies were published in peer reviewed journals,20,21 and 1 did not report any statistical analyses and did not specify the method of allocation to treatment groups. The 4 studies conducted in Ghana were not peer-reviewed and had high loss to follow-up due to movement from the study area.22 Two of the 4 studies were small preliminary studies. As previously mentioned, the dietary protein intakes of the children were not well documented, which makes it difficult to assess the protein adequacy of the baseline diet in the studies that reported no impact of QPM. Therefore, the efficacy of QPM for child growth based on these studies remains uncertain."

[6] For the central estimate, this is effectively a small upwards adjustment to the current approach in the CEA (30% vs 33% adjustment to the Gunaratna et al. (2010) central estimate).

Impact of stunting on mortality and disability

New Seed's existing CEA contains a standard and an "alternative" approach to estimating DALYs per case of stunting. Below, we first discuss how the approaches estimate mortality impacts, and then discuss how the approaches estimate disability impacts.[7] In each section, we also put forward our favored approach.

Comparing current approaches to estimating mortality

Briefly, the **standard approach** estimates the relative distribution of those consuming biofortified maize compared to the Guatemala baseline across bands of stunting, and then uses all-cause mortality risk-ratios from Olofin et al. (2013) to estimate impacts on mortality risk. They ultimately calculate a figure of 0.305 (undiscounted) years of life lost (YLLs) from a case of stunting.[8]

The **alternative approach** uses global estimates for deaths from a recent paper (Troeger et al., 2025) as part of the Global Burden of Disease (GBD) study, although we note that the Olofin et al. (2013) estimates are mentioned as an input in the GBD study. The analysis to inform the alternative approach is done at the global level to generate a general estimate for YLLs from a case of stunting, which they ultimately estimate at 0.661 YLLs (more than double the estimate from the former approach).

We note two other key differences between the approaches:

- **The standard approach anchors the counterfactual life expectancy of a child dying from stunting at the country life expectancy, while the alternative approach uses GBD's standard normative assumption of 89 years.** For Guatemala, where life expectancy is 69 years, this is a significant disparity, although the impact on impacts is reduced substantially because of the current 4% time discounting applied to future years.
    - **Relatedly, the GiveWell-style units of value assigned to child deaths do not align.** In the standard approach, a child death is assigned the GiveWell standard of 119 units. In the alternative approach, all DALYs (including those contributed by YLLs from child deaths) are assigned the GiveWell value of 2.3 units. Because of their use of the normative assumption of life expectancy in a healthy reference population, this results in a value of 204 units being placed on child deaths, which is 71% higher than the standard approach. There is further misalignment because in calculating the discounted DALYs averted, the alternative approach uses the actual country-level value for life expectancy (so equivalent to the standard approach), rather than the normative value for life expectancy.
- **The standard approach includes impacts of mild stunting (height-for-age Z-score (HAZ) –1 to –2) on mortality, whereas the alternative approach explicitly excludes these.** This reduces the alternative estimate by 40%, making it closer to the standard estimate.

[7] However, we do spend more time critiquing and modifying the alternative approach. This is because it uses newer GBD estimates for deaths and disability from stunting, which we prefer to use where possible. More explanation here.
[8] The standard sheet estimates 112 YLLs averted through 367 stunting cases averted, equivalent to 0.305 YLLs per stunting case.

We also note two key issues arising from the use of a global estimate in the alternative approach:

- **The alternative approach assumes that the absolute impact of stunting on under-5 mortality is constant across countries (0.75%)**, whereas it is much more likely to be related to the baseline under-5 mortality rate. The GBD paper also produces country-level death estimates from stunting. Our analysis shows that according to the estimate for Guatemala, the probability that a stunted child dies before the age of 5 is closer to 0.36% (less than half the global estimate).[9]
- **The global "case-averted multiplier" is too large for high-prevalence populations like Guatemala.** The alternative method applies an adjustment for the fact that while their method calculates DALYs averted from avoiding a case of stunting (i.e., moving an individual from HAZ < −2 to HAZ >/= −2), New Seed will also impact individuals whose HAZ is improved but will not cross the −2 threshold. As outlined in the stunting model for the alternative approach, the exact correction factor depends on the baseline prevalence in the country: countries where the mean height distribution is closer to the −2 threshold will need a smaller adjustment. This effectively inflates the mortality estimate for Guatemala.

Our suggested approach for mortality

We amended the stunting model used for the alternative approach to show our preferred approach, specifically for Guatemala:

- We used country-level death and DALY estimates from the GBD paper, as well as country-level estimates for annual births drawn from the CEA sheet (in turn from UN estimates). For reasons detailed further below, we think that drawing from GBD estimates is preferable where possible.
    - For the same reason, we retained the estimate for YLLs from a child death that GBD bases on the life expectancy of a healthy reference population, rather than a country-level estimate for life expectancy.
    - This also effectively retains impacts on mortality from mild stunting, in parallel with the standard approach, and again aligns with how GBD (and Olofin et al., 2013) model mortality effects from stunting.
- We amended the case-averted multiplier to the approximately appropriate value for Guatemala's stunting prevalence rate.[10]

This results in an (undiscounted) value of 0.616 YLLs per stunting case averted in Guatemala.

Comparing current approaches to estimating disability

The GBD paper, from which the alternative approach draws its estimate of mortality, estimates that only 0.2% of DALYs caused by stunting come from disability. Back-calculating from the

[9] 1,090 stunting-attributable deaths (IHME, 2025) for under-5 year olds ÷ (400,000 annual births * 78.6% stunting prevalence [for stunting defined as HAZ < -1]) = 0.36%.

[10] With more time, we would redo this modeling to calculate the case-averted multiplier corresponding to the stunting prevalence estimate we use elsewhere in the model. However, this approximation will not have a substantive impact on results, as the difference is small (the case-averted multiplier corresponds to a stunting prevalence rate of 40%, while the estimate we use for prevalence elsewhere is 45%). Guatemala's prevalence rate is itself approximate as prevalence estimates vary. Final stunting mortality estimates also do not contribute greatly to the final estimates of value in GiveWell's valuation framework.

GBD's estimate for years lost to disability (YLDs) estimated for Guatemala, the GBD effective estimate for the disability weight from stunting is negligible.

The alternative approach does not take this estimate. Instead it triangulates evidence to construct its own estimate of the disability weight from stunting, and then multiplies this by expected years of life to estimate a separate (and much larger) estimate for YLDs.

Below, we identify two particular issues with the alternative approach New Seed takes to constructing the disability weight for stunting:

- **There is potential double-counting in the disability weight**.[11] New Seed anchors the lowest level of disability weight associated with stunting to the GBD disability weight for "borderline intellectual functioning."[12] Separately, they include an impact from stunting on income, which their EA forum post (Markel et al., 2026) states is "almost certainly primarily due to cognitive impairment," whilst also noting potential channels through lower physical strength and discrimination based on height.
    - There is reason to think that including these effects separately double-counts the impact of stunting on cognitive impairment. It is true that there is arguably a disability burden to having cognitive impairment, which is independent from its impact on an individual's income: for example, cognitive impairment would also affect one's ability to conduct non-income generating activities such as household work, and in a harder-to-measure but nonetheless significant way, limit an individual's understanding and appreciation of the world. However, the GBD (2014) method for eliciting views on disability weights, which involves providing survey respondents with two hypothetical individuals with different health states and asking them who is "healthier," may result in respondents implicitly incorporating the impact of intellectual disability on income within their judgement of its burden. In this sense, the disability weight may already partly capture this income effect.[13] We note that in their cost-effectiveness model for Pure Earth, GiveWell models the impacts of IQ gains from reduced lead exposure only through its impact on consumption (not direct health impacts), so there is precedence for excluding direct health impacts to avoid the risk of double-counting.
- **The comparison of stunting to conditions affecting physical appearance neglects general equilibrium effects of populations being stunted**. New Seed's EA forum post (Markel et al., 2026) suggests that "mild acne vulgaris" and "mild alopecia areata" (patchy hair loss) are "probably less bad" than stunting, therefore placing the disability weight higher than those associated with these conditions. While being two standard deviations below average height within a population[14] likely represents a substantial disadvantage

[11] We note that this is also the case for the standard approach, which estimates a disability burden based on the GBD Borderline idiopathic developmental intellectual disability weight.
[12] This is described as: the person "is slow in learning at school. As an adult, the person has some difficulty doing complex or unfamiliar tasks but otherwise functions independently."
[13] A review by Tilling et al. (2010) finds mixed evidence on this question: in some studies, explicitly asking respondents to factor in income effects into health state valuations changed their answers (implying that ordinarily respondents do not, and therefore there is not double counting here); but other studies found that respondents already seem to factor in income effects.
[14] For reference (WHO, 2020), this is approximately 162 cm (5' 4") in the WHO reference population for 19-year old boys, where the average is 177 cm (5' 10").

in terms of physical attractiveness (and even economic discrimination[15]), those two standard deviations below the *reference* population in New Seed's target countries live in populations where stunting is quite widespread. For example, according to their own analysis, 48.3% of children 6–59 months are stunted in Guatemala. Being stunted in this context likely represents a much smaller disadvantage in terms of physical appearance.

Our suggested approach for disability

We think that the most defensible approach for a central estimate would be to use both YLLs and YLDs from stunting estimated by the GBD study. We agree with New Seed that there are reasons to think that this underestimates the disability burden from stunting: even accounting for the points made above, there are likely residual effects on cognition and physical appearance, and it is surprising that the GBD estimates do not account for it.

However, we also think that there are inherent issues with selecting from the paper only the estimate for deaths from stunting, while not using the paper's estimate for disability burden.[16] GBD estimates, while having received criticism from some experts (Mathers, 2020), remain the most comparable and widely used estimates of burden in the global health cost-effectiveness space and are produced through substantial research effort. Particularly given the other potential issues we note with the alternative approach, we think that not using the GBD's estimate for disability burden risks damaging the comparability (and potentially, legitimacy) of the New Seed CEA to CEAs of other global health and development interventions. We think that the triangulation process and the prospective review on the EA forum are valuable, with points that should influence the GBD study in their next round of estimation for the burden from stunting.[17] However, we don't think this is a sufficiently rigorous process to justify amending the estimates by the GBD study as our central estimate. However, we think that the argument is strong enough that an upper estimate should include the (central estimate) of disability weight using the triangulation process followed by New Seed (0.024).

Evaluating New Seed's modeling approach

Here we review the rest of the modeling in New Seed's cost effectiveness analysis. We break this down into the following sections:

- Farmer adoption and biofortified maize production
- Farmer economic impacts
- Nutrient intake and impacts
- Costs

Farmer adoption and biofortified maize production

We reviewed the modeling underlying New Seed's estimates of farmer adoption of biofortified seeds, and consequent maize production. We also interviewed New Seed's Operations Director Federico Fiallos to assess the likely accuracy of projections of future seed production and sales.

[15] See Cinnirella and Winter (2009).
[16] As the EA forum post (Markel et al., 2026) points out, the GBD previously included a disability weight for stunting. The fact that this paper does not (effectively) include a disability burden from stunting suggests that GBD have reviewed the evidence on this and ultimately chosen to not include disability burden from stunting.
[17] We note that a peer-reviewed publication may be more likely to influence GBD researchers.

It is worth noting that this part of the modeling, in conjunction with farmer economic impacts, is very influential to final impact and cost-effectiveness estimates in New Seed's existing CEA. Farmer economic impacts through improved yields contribute ~60% of the (discounted) monetary value of all modeled impacts, and 67% of the GiveWell-style units of value accrued. Furthermore, estimated yields feed into the scale of nutritional benefits, which provides the remaining estimated impact.

Seed production and adoption

New Seed makes ambitious projections for growth of seed sales and donations. Accurate projections for sales and donations are important because, given several fixed costs, cost-effectiveness should increase with scale.[18] In Guatemala, New Seed targets doubling seed sales in 2026, and almost quadrupling the figure for 2026 by 2029. This would make them larger by far than the current largest seed company in Guatemala (Valle Verde).[19] Combined with donation farmers (who are projected to increase at a slower rate), their projections imply quadrupling the number of farmers using New Seed's seeds from 2025 to 2029. This would represent extremely rapid growth: in an interview, New Seed's Operations Director Federico Fiallos acknowledged that these were ambitious targets. He outlined several reasons for strong growth potential:

1. New Seed currently makes up a small share of total seed sales in Guatemala.
2. It has a strong record, increasing from around 4,000 bags to 25,000 bags in ~5 years.[20]
3. The largest seed company in Guatemala, Valle Verde, has maintained steady sales with a stagnant strategy.
4. New Seed's seeds are substantially cheaper than gold-standard, high-yield seeds.
5. Its seeds have strong climate resilience.[21]
6. It is doubling its farmer promotion team in 2027.

To ground these projections, we inspected how previous projections of seed sales and farmer reach by New Seed had fared compared to actual figures. We asked Claude to collate values from New Seed's (2026) standard reports and compare them. Its primary output in spreadsheet form is here: we lightly validated the results, checking three rows for different years, and found that Claude had collated figures accurately in these cases.[22]

This exercise shows a pattern of consistent and substantial optimism in New Seed's past projections for seed production and sales. We note firstly that New Seed are themselves highly candid about this, reporting discrepancies between past projections and actual realized production in recent standard reports.[23] The magnitude of overestimation of past projections is large and consistent: realized sales hover between around 60–80% of projections. Notably,

[18] We validated that decreasing bags sold and donated does reduce costs, but not proportionally (e.g., halving bags sold and donated will result in a much smaller than 50% reduction in costs). Calibrated seed sales are especially important to understanding future scale and cost-effectiveness, as New Seed aims to end donations by 2036.
[19] Federico Fiallos (New Seed) told us that Vallo Verde sells around 60,000 bags a year, while the New Seed project will sell 123,000 bags by 2029.
[20] This suggests high confidence that the projected growth for 2026 will be realized.
[21] Fiallos cited farmers telling New Seed that their plants were more able to stand up to wind than rival seeds.
[22] We also found this Claude summary output useful, although haven't validated every claim in it.
[23] See New Seed, 2025, Table 3.

there is a similar magnitude of overestimation in seed production in general (also for donations). This suggests to us that the primary constraint is production, rather than attracting demand for sales.

In correspondence, New Seed shared data showing that their projections for 2026 were accurate, or actually underestimated production. They suggested that this could be explained by more established relationships with third-party seed companies, which produce seeds, as well as hiring a more experienced team to support companies.

Conversely, we note evidence that El Niño may bring (Hackett, 2026) elevated risk to seed companies over the next year (Federico Fiallos mentioned that adverse weather conditions had disrupted production in 2023, so seed production is sensitive to this). Moreover, the projections for 2027–2029 seem especially ambitious to us: if achieved, they would mean that New Seed substantially surpasses the current largest company in Guatemala (Valle Verde) by 2029, with sales approximately 64% the volume of current sales by all seed companies.[24]

Given this evidence, for our central estimate we place a 25% haircut on projected production (sales and donations) for 2027.[25] For our lower estimate, we place a 50% haircut, while for our upper estimate we use New Seed's original projections. To account for the compound growth in projections for later years, we increment the negative adjustment by 5 percentage points for each year after 2027 (including on the upper estimate). We note that even the adjusted central estimate projection implies them almost rivaling the primary seed company by 2029.

Yields of biofortified versus conventional seeds

New Seed's projections assume a growing yield advantage over time to biofortified seeds compared to conventional seeds, as they switch to newer seed varieties. Yields for the F5, F5b, and F9 seeds are based on plot-by-plot comparisons of yields with "control" seeds: these are chosen by farmers based on what they typically plant, and they therefore do represent a strong counterfactual for what farmers would have purchased if they had not bought New Seed's seeds. The relative advantage of New Seed's biofortified seeds in yield compared to these control seeds is the key input to farmer economic impacts, and is therefore critical to cost-effectiveness. The monitoring data for these seeds shows some relative improvements compared to control seeds from F5 to F5b, but mixed improvements from F5b to F9.[26] Notably, for mid- and high-segment farmers, yields for the F9 variant do not show clear superiority to control seeds.

[24] They project selling 83,500 bags in Guatemala, while in correspondence Curt Bowen told us that the entire Guatemalan seed market has stagnated around 130,000 bags for 30 years. While it is reasonable to expect that New Seed's presence will increase the size of the market itself over time, we expect the market growth over 2027–2029 would not be sufficient to account for these ambitious targets.
[25] This is informed by our assessment of overestimations between 20–40%, as well as New Seed's more accurate projection for 2026.
[26] Although, we note that this is partly a function of the "Uncertainty adjustment factor for new seeds" applied to F9. With more time, we would explore monitoring data itself.

Later biofortified varieties (i.e., F11, F13, and F15) are assumed to see improvements in yields,[27] while critically, control seeds are assumed to remain constant in yield over time. This results in large yield benefits to biofortified seeds and large economic returns to farmers.

In correspondence, New Seed presented evidence from their research and development program that yields have improved at a rate of approximately 2.5% annually, similar to the rate of improvement in the model.[28] New Seed does acknowledge, however, that results from R&D plots may not translate to improvements on farmer's fields.

The assumption of stagnant yields for *counterfactual* seeds (those used by farmers if they had not purchased or received by donation seeds from New Seed) may also be inaccurate. Historically, maize yields have improved over time (Duvick, 2005). Given strong economic growth in Guatemala and El Salvador (World Bank Group, 2025), we would also expect farmers to switch to better quality, higher-yield seeds over time. On the other hand, we note USDA (2025) data suggesting that maize yields in Guatemala have actually decreased in the last 10 years, though this may be due to other factors, such as climate change, rather than seed quality. In correspondence, Curt Bowen (New Seed) stated that the Guatemalan and El Salvadoran seed markets have been relatively stagnant in recent history, with El Salvadoran farmers mostly using a single hybrid for 20 years, and many Guatemalan farmers not using hybrids at all. Correspondence with an expert at CIMMYT confirmed the general picture that the market in these countries is relatively stagnant.

Overall, given this uncertainty around both yield growth for New Seed's later variants, and the counterfactual market, we place a small adjustment on the delta between improvements in New Seed's yields and counterfactual yields. For our central estimate, we place a 0.5% improvement on counterfactual seeds with each new variety by New Seed, reducing this difference to 2.5%. For our lower estimate, we assume a 1% improvement, and for our higher estimate, we assume no improvement (equivalent to New Seed's current assumption).

Farmer economic impacts

We reviewed the modeling logic underlying the farmer economic impacts and did not find explicit errors.

Several issues relate to New Seed holding several relevant parameters constant over time. Here we review how this simplification might affect the final results, and ultimately choose to make no modifications:

- **Costs of production per hectare**. On shallow investigation, we think that these are in reality likely to increase over time. As economies grow (World Bank Group, 2025), the cost of agricultural labor (including implicit costs of family labor) will rise. However, these costs should increase similarly for biofortified and conventional production, so we think that this assumption should not influence results. For parsimony, we therefore make no adjustment here.

[27] This is operationalized by assuming a 3% improvement in yields with each generation, although counterbalanced by a one-off 10% negative "Uncertainty adjustment factor for new seeds."
[28] This comparison is not trivial because, in any year in the model, New Seed is selling multiple seeds. From 2025 to 2029, New Seed's sales move through approximately five varieties.

- **Price of maize.** As yields are higher for biofortified production, this is influential on the income differences between biofortified and conventional production (higher prices will result in a greater absolute advantage for biofortification). In real terms (FAO, 2020), however, maize prices seem to have been approximately stable over the last 10 years, albeit with substantial fluctuations even within years.[29] The assumption of a constant price does not seem unreasonable, so we make no modification here.
    - On the other hand, there is reason to think that prices for farmers will be lower than the wholesale prices that values from the FAO Food Price Monitoring and Analysis Tool (FAO, 2020) are based on. In El Salvador (World Bank Group/FAO, 2025), maize was purchased from farmers at 76% of the wholesale price.[30] A countervailing factor is that some of this production may be for subsistence, which means that production effectively substitutes for grain which would have been purchased by farmers: the value to farmers would therefore be equivalent to the retail price (higher than the wholesale price). For parsimony, we therefore choose to not make an adjustment here.
- **Consumption.** The baseline value for household consumption affects how additional income from biofortified production increases proportional income, which affects how New Seed's impacts are quantified in GiveWell's units of value.[31] Per capita incomes have been increasing (World Bank Group, 2025) in Guatemala and El Salvador, so holding this constant may exaggerate proportional income increases in future. However, the 4% discount rate used by the CEA is designed to account (Kudymowa et al., 2023) for the impact of these income increases, and we therefore make no modification.

We identified two further issues:

- **Estimated yields used to estimate farmer revenue do not make an adjustment for post-harvest losses.** To estimate nutrition impacts from New Seed's biofortification, New Seed makes two subtractions to naive totals for yields: a 12% subtraction for post-harvest losses, and an 8% subtraction discount for non-food uses. When calculating farmer revenue, however, New Seed does not make these discounts, overestimating the revenue (and therefore net income) advantages from biofortified yields. In correspondence, Katie Adams pointed out that for farmer incomes, this subtraction should not include post-farmgate losses, such as in transportation and market storage losses. This represents two out of nine stages from field to market where losses occur in Affognon et al. (2015). Lacking evidence on which of these is most important, we naively assume equal losses at each stage, and therefore **include a 9% subtraction for post-harvest losses affecting farmer income.**[32]
- **The CEA uses the (doubled) value for income gains to estimate GiveWell units of value.** GiveWell's standard value for a one unit-increase in ln(consumption)—approximately doubling someone's income—for a year is 1.4 units.

[29] Ideally, the estimated maize price should be averaged over a multi-year period to reduce the influence of these fluctuations.
[30] From source, p. 33, (translated from the Spanish by Google translate): "In the first quarter of 2024, informal intermediaries purchased maize from farmers at approximately USD 16 per quintal and sold it to wholesalers in San Salvador for between USD 17 and USD 18 per quintal… In the first quarter of 2024, wholesalers in San Salvador purchased domestically produced maize from informal intermediaries at prices ranging from USD 17 to USD 18 per quintal, and subsequently sold it at an average price of USD 21 per quintal." **Farmers receive (16/21=) 76% of the wholesale price.**
[31] These are twice as valuable in the 'livelihood units' framework.
[32] Seven out of nine stages: 78% of losses assumed to be pre-farmgate. 78% of 12% subtraction for overall losses = ~9% subtraction for pre-farmgate losses.

Last year, however, they expanded their livelihoods program (GiveWell, 2025), stating that they are open to funding interventions which would "appear as cost-effective as our standard recommendations to a donor who values income gains twice as much as our standard moral weights." New Seed's existing impact summaries therefore report sums of GiveWell units from their health and income impacts, which uses a doubled value for income doublings, as well as separately reporting this income doublings impact on its own.

- We think that reporting these figures on their own risks readers viewing the overall values as using GiveWell's standard moral weights. As a hybrid nutrition and livelihood program, New Seed could theoretically be eligible for not just livelihood program funds but other programs (which make up only $10 million out of a $300 million+ budget; GiveWell, 2025). To be comparable to other CEAs reporting GiveWell units of value, we instead report GiveWell metrics using both the standard and doubled weights for income gains. In the livelihood component, we also include modeled income gains from nutrition (while the CEA previously only included direct farmer economic impacts). We base this on the fact that the livelihoods program seems to be considering (GiveWell, 2025) a wide range of programs, which lead to income increases, and we think this could theoretically include nutrition programs leading to income gains.

Nutrient intake and impacts

The influence of nutrition impacts[33] on the final results in New Seed's original CEA depends on whether health or economic impacts are emphasized. For Guatemala, iron contributes around 68% of DALYs averted through New Seed's work,[34] but this only makes up 16% of monetary impacts, and only 4.5% of GiveWell units of impact, which are dominated by the impact on farmers' earnings. To summarize: for donors interested in health impacts, iron impacts are significant, but for donors more interested in earnings, they are a relatively small part of overall impacts.

We note the following assumptions which could potentially bias estimates of impact downwards:

- **New Seed assumes 52% and 43% losses of iron and zinc content respectively from milling, which overstates the likely losses in Guatemala and El Salvador**. These parameters come from studies in Sub-Saharan Africa (Taleon et al., 2025). Gallego-Castillo et al. (2021) measure nutrient losses from different kinds of maize processing common in Latin America, and find that in tortillas, iron and zinc content did not decrease, while in arepas and mazamorra, they did. Tortillas are the primary form of maize in Guatemala and El Salvador. **We assume 10% losses of iron and zinc content from milling, as some maize products may still use processing that results in nutrient losses.**
- **New Seed does not include an impact for zinc intake through biofortification, which likely masks a (small) health impact**. The CEA justifies this well based on the fact that trials of zinc-biofortified staples have shown no consistent effects on diarrhea. Two trials have shown some signal of impacts on lower respiratory infection, but this evidence is

[33] In effect, this only includes iron impacts, since zinc impacts are zeroed out in the model.
[34] Note that this is using the standard version of New Seed's version of the CEA, before our suggested changes.

also weak for reasons set out in the CEA, and with an effect that would not be influential on final results.

- **While conservative, we think this decision is justified and for our central estimate, make no change here.** In our cost-effectiveness analysis for Sanku, we did include an impact on under-5 mortality through zinc intake, but the impact was very small and was ultimately not influential on final results. The evidence on zinc flour fortification (Tsang et al., 2021) is also on a shallow view stronger than that for zinc biofortification, which the CEA cites, with multiple trials showing significant impacts on plasma/serum zinc concentrations, and some (although still highly uncertain) evidence on health impacts.
- **Given the mixed evidence, for our high estimate we do not zero out the zinc impact.** Instead, we include the estimate as built by the New Seed CEA (which only zeros out the estimated impact in the final stage).

Economic impacts via reducing stunting

We identified one inconsistency between how economic impacts were estimated for stunting compared to iron. The stunting impacts included a multiplier for resource sharing within households, which the iron impacts did not. This is a standard multiplier (GiveWell, 2023) for GiveWell and the reasoning behind it seems strong to us, so we include this multiplier for the iron impacts as well.

Counterfactual attribution and discount rates

Counterfactual attribution related to government co-financing

New Seed's long-term model relies to an increasing extent on government cofinancing (see here). As a result, we adjust the counterfactual attribution of modeled benefits downwards, reflecting our view that they should not be fully credited to New Seed's marginal dollar. To inform our choice of discount for this counterfactual attribution, we follow the example of GiveWell's assessment of New Incentives (GiveWell, 2024), a conditional cash transfer charity that leverages ~3.5× its own program costs from government and Gavi. In their assessment of New Incentives, GiveWell estimated a leverage discount of −3 to −9%, and a funging discount of −9% to −10%, with combined totals varying between −13% to −17%. This estimate depends on the assumed relative cost-effectiveness of what the government would have spent money on in the absence of the program. While the context in Guatemala may be quite different to that of New Incentives, we do not have strong reasons to think that relative cost-effectiveness would be much higher or lower. We therefore anchor on the leverage adjustment GiveWell uses. New Seed leverages ~0.7x from government relative to core costs over 2026–2029,[35] so we assume its leverage adjustment should be approximately a fifth of that applied to New Incentives: a 1.2% discount.[36]

In terms of funging, the question in the New Seed context is: would the government have supported biofortified seed eventually, without New Seed? We acknowledge that New Seed provides substantial expertise in seed development and lobbying to encourage the transition to

[35] When comparing New Seed's total program cost (i.e., R&D, farmer promotion, seed production, M&E, public policy, and marketing) against the governments' total cost (i.e., subsidy costs, donations, and indirect costs), discounted at 4%.
[36] One fifth of the midpoint of −3 to −9% (−6%) is −1.2%.

biofortified seeds in Guatemala and El Salvador, and that a vast majority of progress until 2029 should be credited to New Seed as a result. We nonetheless believe it is unreasonable to assign the entirety of the benefits to New Seed, since part of the government budgets would plausibly have gone to other moderately cost-effective agricultural or nutrition programs. There is also some probability that the government or another funder would have supported biofortified seed eventually, absent New Seed. For their assessment of New Incentives, GiveWell places a ~9–10% negative funging adjustment, which assumes that there is only a 10% probability that the government would have funded the programming in the absence of GiveWell. Overall, we do not have strong reasons to think that the probability of the Guatemala and El Salvador governments supporting biofortified seeds would be much more or less than this, so we also use this 9–10% funging adjustment.

To ensure alignment with GiveWell, we place an 11% haircut on all benefits (to account for counterfactual attribution to government co-financing). We place a 21% and 1% haircut for our lower and upper estimates, respectively.

Discount rates

New Seed's original CEA reported results using two discount rates: a 4% rate commonly used by GiveWell, and a 4.3% rate recommended by Rethink Priorities in their review of GiveWell's approach (Kudymowa et al., 2023). With sufficient time, we would explore these issues further and construct a discount rate tailored to the specific New Seed context. Lacking this time, we go by convention and use GiveWell's standard 4% discount rate.

Costs

Core costs vs long-term investment

Currently, costs enter the model as two lines per country: (i) core operating costs,[37] and (ii) long-term growth investments.[38] The source of the underlying split comes from New Seed's financial projections model, which was imported into the existing CEA via an IMPORTRANGE function. To ensure the figures in this report are the figures we audited, we chose to replace the live links with a dated snapshot of the projections data, which is stored in a separate "Projections snapshot" tab in our modified CEA.

It seems reasonable to us to differentiate between core costs and long-term investments, but it is debatable which categories should be considered core vs long-term, and what the precise split within specific categories should be. With limited time, we did not investigate the precise ways in which New Seed chose to apportion core and long-term spending. We acknowledge that it is reasonable to assess cost-effectiveness over the study period (2026–2029) by excluding from the denominator any truly long-term investments that will only have an impact many years into the future, but, given our uncertainties, we caution care when interpreting figures in the CEA that rest on core costs only.

[37] Core costs include Research and Development (R&D), Finance, Administration, and Human Resources (FAHR), Farmer Promotion, Seed Production, Monitoring & Evaluation (M&E), Fundraising, Public Policy, Seed Company Support, Marketing, Subsidy, and International Expansion.
[38] Long-term growth investments (which are assumed by New Seed to kick in from 2026 onwards) include R&D, FAHR, M&E, and Fundraising.

In its bag subsidy costs, which are set differently in each country,[39] New Seed distinguishes between a production and commercialization subsidy. The production subsidy (37.5% of the total subsidy) is paid to cover producing the seed. The commercialization subsidy (62.5%) is a reimbursement once the bag sells at a discounted price. While this split is not mathematically relevant in the current formulation of the CEA, it does reflect the fact that different payment mechanisms exist in New Seed, and these could have plausibly different budget approvals, each with different risks of failure. While it is outside the scope of this project to examine this split in further detail, the proportional split between these categories could be politically salient as governments increasingly take on the burden of subsidies (see below).

An additional indirect cost is set in the CEA by New Seed, which incrementally increases from 6.5% to 10% of the subsidy in Guatemala and 7% to 10% in El Salvador. Federico Fiallos explained that this funds verification that subsidised bags are genuinely biofortified, and is carried out by actors approved by the Fondo Maíz de Poder, with genotyping of producers' fields by ICTA and nutritional quality control and *agroservicio* price audits by INCAP. The rate rises with volume and is modeled to plateau at 10% as testing technology gets cheaper. We note that this indirect cost is calculated on the combined New Seed and government subsidy, but is charged entirely to the government.

Fixed and variable costs

New Seed treats salaries and headcount as fixed, and everything driven by bag volume as variable, a split put by Esteban Fernandez (New Seed) at 80% fixed/20% variable in 2026, moving to 70%/30% from 2027 onwards. This matters for how cost-effectiveness responds to adoption shortfalls: since most of the cost base is fixed, sales underperformance can lead to severe losses. We therefore implement a way for sales subsidies and donated-seed costs to scale according to bag volume, and apply New Seed's fixed/variable ratio only to the residual cost base. Costs for 2021–2026 are held fixed across all scenarios, since these are actuals (with New Seed confirming government funding for 2026 subsidies).

It should be noted that cost figures in the CEA are presented as gross of seed-sales revenue, meaning that all denominators in the model represent gross spend. This is an upward bias on cost (net costs are necessarily lower), but gross costs are an acceptable convention for cost-effectiveness reporting.

Donations and government co-financing

One of New Seed's most important operational assumptions is that the governments of Guatemala and El Salvador will increasingly fund a share of the programs in their respective countries. We raise two critical points regarding this assumption:

- **The existing CEA lacks transparency regarding government contributions.** Calculations and projections of government costs sit almost entirely within an external "Projections" spreadsheet, so several of the principal drivers of the modeled cost base are invisible to a reader of the CEA itself. We therefore built a "Government subsidies" tab into our version of the model, which reconstructs the government's cost from the underlying levers (bag volumes, the per-bag subsidy, the production and

[39] In 2026, New Seed set subsidies at $51.28 for bags in Guatemala, and $70.00 for bags in El Salvador.

commercialization split, the New Seed and government shares, the indirect-cost loading, and the government share of donations) for each country and year.

- **A large share of the government contribution is not yet secured.** New Seed has received Q8M (~$1.0M) from the Guatemalan government against the 2026 subsidy, and the government has since committed Q15M (about $1.9M) for 2027. Their working assumption is that this continues at Q22M in 2028 and Q30M in 2029, reaching full government funding in 2030. Because those are fixed quetzal amounts growing more slowly than the subsidy bill, the government's modeled share of the Guatemalan subsidy falls from 97% in 2027 to 87% in 2029.
    - New Seed's own projections imply a government contribution of ~$18.7M over 2026–2029. After our volume adjustment, the model carries ~$13.1M. Of that, ~$2.6M is covered by 2026 disbursements and the Q15M committed for 2027; the remaining ~80% is projection. For El Salvador, where the schedule reaches 100% government funding a year earlier than Guatemala's, New Seed describes the basis as a prediction resting on the backing of the technical division of the Ministry of Agriculture and a facilitated route to the executive branch, rather than any commitment. New Seed staff were explicit that the intermediate steps in both countries are targets, rather than negotiated positions, and they acknowledged the risk that a future government could cancel existing commitments. To mitigate this risk, New Seed plans to hire a director of public policy in the near future, although it is difficult to estimate the effect this position would have on improving the likelihood of securing government funding. Because the subsidy is what makes the seed affordable at scale, a stalled subsidy would reduce both costs and benefits.
    - As explained here, we apply a 25% discount (with incremental 5% step-down adjustments from 2027 to 2029) to the projected production figures, to account for New Seed's ambitious forecasts over the study period. **This discount effectively accounts for the uncertainty that government co-funding will materialize to support the production figures as laid out by New Seed, so we do not add an additional discount.**

Capital expenditure

New Seed annualizes the cost of capital projects over their useful life at ~10% a year, which is standard practice in the region and which we think is the right treatment. The largest single capital expenditure project is a ~$1.07M production facility that should be online in 2028 or 2029. Since the CEA horizon ends in 2029, only the first two years (~$219,000) of the processing plant's depreciation are included as a cost line item.

We note one inconsistency in the treatment of capital expenditure: two of the three capital projects carry an additional 10% loading on the annual depreciation charge and the third does not. New Seed confirmed this is an operations-team contingency for costs not otherwise captured, rather than part of the depreciation schedule; we leave it in place, but note it adds a modest ~$4,700 a year to modeled cost.

Cost-effectiveness

Complete impact and cost-effectiveness metrics are shown in the summary tab. We provide here a very brief overview of key metrics. All values shown are for our central case.

We present results in the following ways:

1. Standard impact and cost-effectiveness metrics
2. GiveWell-style valuation including livelihood and nutrition impacts. Following GiveWell convention, we assign only the philanthropic cost (i.e., New Seed costs) to the denominator. We also split by whether standard weights or "livelihood program weights" are used to assess impacts on outcome (see discussion here).
3. A "societal" valuation, which combines both New Seed's costs and the full government contribution to the subsidies in the denominator. We consider this to act as a sensitivity test informing us about the scale of the government leverage through time.

Standard impact and cost-effectiveness metrics

New Seed's programs in Guatemala (over the period 2021–2029) and El Salvador (2024–2029) will have been responsible for 8,963 and 3,312 DALYs averted respectively, after applying a 4% discount rate (Table 1). The total monetary value of their impacts equates to ~$198M in Guatemala and ~$122M in El Salvador. The vast majority of the modeled impacts are achieved in the period 2026–2029.

Table 1: Key impact metrics, discounted at 4%

	Guatemala		El Salvador	
	2021–2029	2026–2029	2021–2029	2026–2029
DALYs averted	**8,963** (5,162–74,006)	**6,795** (3,572–58,744)	**3,312** (1,390–9,298)	**3,238** (1,343–9,140)
Monetary value of modeled impacts	**$197,621,379** ($116,074,387–$957,847,503)	**$151,712,091** ($80,798,398–$764,499,246)	**$121,682,992** ($54,144,520–$367,821,501)	**$119,896,382** ($53,061,540–$362,733,313)

Note. Pessimistic and optimistic bound estimates shown in brackets.

These impacts are achieved very cost-effectively (Table 2). Considering only core costs—excluding long-term investments, although see caveat about this distinction here—this comes at a cost of $2,977 per DALY averted over the period 2021–2029 and a significantly lower $1,573 per DALY averted over the period 2026–2029. The programs have a benefit to cost ratio of 8.7 (2021–2029), rising to 17.2 for 2026–2029, equivalent to a 774% (2021–2029) and 1,621% (2026–2029) return on investment.

Table 2: Key cost-effectiveness metrics, aggregated across Guatemala and El Salvador, discounted at 4%

		2021–2029	2026–2029
Core costs	Cost per DALY averted	**$2,977** ($5,254–$464)	**$1,573** ($2,782–$264)
	Income & nutrition benefit-cost ratio	**8.7** (4.9–34.3)	**17.2** (9.8–63.0)
	Income & nutrition return-on-investment	**774%** (394%–3330%)	**1621%** (879%–6200%)
Overall costs (core + long-term investment)	Cost per DALY averted	**$3,551** ($6,331–$549)	**$2,276** ($4,217–$368)
	Income & nutrition benefit-cost ratio	**7.3** (4.1–29.0)	**11.9** (6.5–45.2)
	Income & nutrition return-on-investment	**632%** (310%–2801%)	**1089%** (546%–4418%)

Note. Pessimistic and optimistic bound estimates shown in brackets. Cost per DALY is reported in 2026 USD.

GiveWell-style valuation

In GiveWell's valuation, New Seed's programs are dominated by the impacts on livelihood (Table 3), which includes both direct impacts on farmer incomes and indirect impacts through better nutrition leading to income gains. This, in turn, places a large influence on whether standard weights or the alternative weights used by the livelihood program are applied (see discussion here).

Table 3: Key impact metrics, in terms of the GiveWell framework

	Guatemala		El Salvador	
	2021–2029	2026–2029	2021–2029	2026–2029
Total units of health value	25,683 (12,288–466,852)	19,404 (8,494–370,040)	5,177 (2,466–62,127)	5,063 (2,383–61,067)
Total units of livelihood impact value (standard weights)	173,021 (82,422–730,042)	132,346 (57,277–583,091)	63,123 (31,266–198,636)	62,297 (30,739–195,905)
Total units of livelihood impact value (livelihood program weights)[40]	346,042 (164,843–1,460,084)	264,692 (114,554–1,166,183)	126,247 (62,531–397,272)	124,595 (61,477–391,811)

Note. Pessimistic and optimistic bound estimates shown in brackets.

The programs' cost-effectiveness places them above GiveWell's benchmark for unconditional cash transfers (Table 4). Using livelihood program weights, the programs show a cost-effectiveness of 4.6x the cash transfer benchmark for the period 2021–2029, and 8.7x cash transfers for the period 2026–2029. Using the standard weights, the values drop to 2.4x (2021–2029) and 4.6x (2026–2029).

This places their cost-effectiveness for 2026–2029 above GiveWell's bar of 6x for funding. We note one key caveat here: these doubled weights apply only to GiveWell's Livelihood Program, which makes only a share of their total portfolio. Results using the standard weights remain under the bar. The upper bound for this estimate is well above the bar, as it is for every estimate, even when including long-term costs within the denominator.

[40] Within livelihood impacts, we include the economic impacts caused by better nutrition. New Seed's existing CEA only includes farmer economic impacts within livelihood impacts.

Table 4: Cost-effectiveness, in terms of multiples of GiveWell's benchmark, aggregated across Guatemala and El Salvador

	Cost-effectiveness (standard weights)		Cost-effectiveness (livelihood program weights)	
	2021–2029	2026–2029	2021–2029	2026–2029
Core costs	**2.4** (1.2–12.6)	**4.6** (2.4–22.5)	**4.2** (2.2–18.3)	**8.7** (4.6–37.1)
Overall costs (core + long-term investment)	**2.0** (1.0–10.6)	**3.2** (1.6–16.2)	**3.8** (1.9–17.4)	**6.0** (3.0–26.6)

Note. Pessimistic and optimistic bound estimates shown in brackets.

Societal valuation

To provide a sensitivity test on the scale of government leverage, we report a "societal" valuation combining both New Seed's costs and the full government contribution (Table 5). When excluding long-term investment costs, the core societal cost-effectiveness for 2026–2029 is 3x cash transfers using standard weights, and 5.6x using livelihood program weights.

Table 5: Societal cost-effectiveness (combining New Seed's costs and full government contribution), in terms of multiples of GiveWell's benchmark, aggregated across Guatemala and El Salvador

	Societal cost-effectiveness (standard weights)		Societal cost-effectiveness (livelihood program weights)	
	2021–2029	2026–2029	2021–2029	2026–2029
Core costs only (core + government)	**2.1** (1.3–9.0)	**3.0** (1.9–12.0)	**3.9** (2.4–14.7)	**5.6** (3.6–19.8)
All costs (core + long-term investment + government)	**1.8** (1.1–8.0)	**2.4** (1.5–9.9)	**3.4** (2.1–13.0)	**4.4** (2.7–16.4)

Note. Pessimistic and optimistic bound estimates shown in brackets.

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Rory Todd researched and wrote the report and served as project lead. Jerome Mayaud researched and supervised the project.

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Appendices

Appendix A: What we would do with more time

Given the sophistication of New Seed's existing CEA and limited time to review and implement modifications, there are several areas where, with more time, we would review and likely make changes. Below we list what we would do next, given more time.

- **We would explore widening economic impacts of reducing iron deficiency to include impacts on other forms of heavy manual labor besides agriculture, as well as white collar work through reduced cognitive capacity.** In another project assessing a charity focused on improving nutrition, Rethink Priorities concluded that evidence on the link was strong enough to have an impact on white-collar work, although these were modest compared to the impact through reducing physical activity.
- **We would resolve issues with New Seed's method for estimating the distribution of iron intake results, which results in implausibly high values**. Because they don't have iron intake data, New Seed instead uses a method which imputes a distribution based on anemia prevalence data. For Guatemala, this results in estimated average intakes of 18.4 mg/day iron for children 6–59 months, and of 37.7 mg/day for women of reproductive age. This compares to (US) RDAs of 7 mg/day for 1–3 year olds and 18 mg/day for women 19–50 (NIH, 2025). We think it is highly unlikely that children 12–59 months consume three times the US's recommended daily intake in Guatemala.
    - We did not have time to identify exactly what is driving this issue, but note that the reference underlying the method does not recommend (NIH, 2000) its application in cases where the true prevalence of inadequacy is lower than 8 to 10 percent. This is the case for the estimated deficiency levels for children 6–59 months and 5–12 years in the CEA.

  We think that there are three potential solutions to this issue.

  1. Passarelli et al. (2024) model distributions of intakes of iron among other nutrients and provide estimates for country and age-group intake inadequacies here (GitHub, 2026).
  2. Meenakshi et al. (2010) use a different approach, which does not require intake distributions, only average intakes.
  3. For our Sanku report, we did not explicitly model how improved iron intake would change the distribution of inadequacy and, therefore, deficiency. Instead we drew on direct results from supplementation and fortification trials for the impact on deficiency.

  Given time constraints, we were not able to implement these changes. We are unsure of the direction of bias from this issue, but since iron impacts are not pivotal to results in the model, we do not think this omission would have a large substantive impact on cost-effectiveness.
- **We would explore assumptions around replanting.** These make up a non-negligible share of farmers planting biofortified seed. The maize from this seed is assumed to have equal yield and nutrient content compared to from first planting, but our shallow view is that this assumption is likely optimistic.
- **We would inspect the studies underlying the Gunaratna et al. (2010) meta-analysis to assess potential direction and magnitude of bias.**

- **We would include trends for other socio-economic and demographic parameters, besides population and stunting prevalence.** This includes:
    - Life expectancy
    - GDP per capita
    - Labor share of GDP
    - Household consumption (among maize-producing households)
    - Child mortality from stunting
    - Low and high variants for population projections, as part of the uncertainty bounds
- **We would look for analogous examples to ground estimates of seed production**. We would look for scaling by seed companies elsewhere to understand how realistic the ambitious growth projections are. Our expert interviews did not reveal any substantive updates to our discounting approach to production, but further interviews could help clarify some of our uncertainties.
- **We would look more into how well R&D data on yields translates into farmer's field settings**. The modeling on improving yields is based on results from R&D testing, which may not be replicated in real world contexts. We would look for past data comparing these, and speak to experts regarding this issue.
- **We would spend more time reviewing discount rates.** The New Seed CEA used different discount rates (4.3% for standard cost-effectiveness metrics and 4% for GiveWell-style results). We ultimately chose to use only the 4% rate, to improve comparability with GiveWell analyses. With more time, we would review how the particular context New Seed operates in should modify this discount rate.
- **We would review the evidence of the impact of stunting on intellectual development**. This underlies the disability weight associated with stunting, as well as the economic impacts. We would look at evidence on both magnitudes and fade-out of effects.
- **We would redo the modeling in the stunting model to calculate the exact case-averted multiplier for Guatemala's stunting-prevalence rate.** The value we currently use is an approximation of this rate (40% rather than 45%).

Appendix B: Stunting rates across countries

Countries	Year*	Full Source Title	Point estimate	Lower limit	Upper limit
Ethiopia	2019	Ethiopia Mini Demographic and Health Survey 2019: Final Report. Rockville, Maryland, USA: EPHI and ICF, 2021.	36.8	34.3	39.4
El Salvador	2021	Encuesta Nacional de Salud (ENS), El Salvador 2021	10.0		
Ghana	2022	Ghana Demographic and Health Survey 2022	17.4	15.9	19.0
Guatemala	2021	Informe de la Línea de Base de la Gran Cruzada Nacional por la Nutrición 2022	46.0		
India	2020	National Family Health Survey (NFHS-5), 2019–21: India. Mumbai: IIPS	35.5	35.1	35.8
Mexico	2022	Encuesta Nacional de Salud y Nutrición Continua, Mexico 2022	12.5	10.3	15.1
Nicaragua	2012	Encuesta Nicaragüense de Demografía y Salud 2011/12 - Informe Final	17.3	15.8	18.9
Rwanda	2020	Rwanda Demographic and Health Survey 2019–20 Final Report. Kigali, Rwanda, and Rockville, Maryland, USA: NISR and ICF.	33.1	31.4	34.9
Uganda	2022	Uganda Demographic and Health Survey 2022. Kampala, Uganda: UBOS. 2023	24.4		