

Ava Forystek
Dublin Coffman High School
Dublin, OH
Philippines, Factor 11: Malnutrition

Philippines: Implementing Vitamin A Into Philippine Diets

Many privileged countries never know what it's like to struggle with eyesight. Most children or adults who complain of impaired vision can just take a trip to the local optometrist, get a pair of glasses or contacts and can see the world clearly. Also, quite often their vision is easily repaired as vitamin deficiency is scarcely heard of in wealthy countries. Many people feel as if vision is something that everyone has, and they don't realize how valuable of a gift sight truly is. The luxury of being able to have clear vision is extremely valuable, it has often caused privileged people to become blind to others who are less fortunate. When they hear of the issue they simply just think, 'Just start a fund to get them glasses' when in reality that won't solve the issue. The issue of vision being an issue isn't in the Philippine populations heredity, it is actually in their diet. In countries such as the Philippines where the diet of the population is mostly rice, they're not consuming one of the most crucial vitamins for vision, Vitamin A.

1. Filipino living

The Philippines are located off the coast of Southern Asia. The country faces extreme poverty and the number of people in these conditions is rising. In 2012 it was estimated that 19.2%, or 18.4 million people were at or below the poverty line and in 2015 it was then determined that the amount of people in poverty rose to 26.3% (Philippine Statistics Authority). These people are living with a daily earning equivalent to about \$1.25. Because of this incredibly low amount of money, families are forced to look to low cost foods which is one of the main reasons that rice is so widely consumed. Most of those who live below the poverty line tend to live in rural areas and work in agriculture, mostly farming and fishing. Many migrants come into the country with no jobs and if they have one, it is usually low paying. A result of this is that many of the Filipino cities are overrun with poverty and many of these citizens can't even afford decent housing, causing the homeless rate to be very high. (Extreme Poverty in the Philippines).

Throughout the country, many different cities all seem to share the same struggles with natural disasters. In 2013, the Typhoon Haiyan swept through, destroying much of the land and caused an estimated 4 million people to become homeless and left them without access to basic needs. Natural disaster relief plans and foreign aid has helped somewhat but many people still struggle from this disaster today (The World Factbook: PHILIPPINES).

In the city of Manila, it is estimated that more than 3 million families are suffering with hunger. Rice, although the not most nutritious food is the savior for many of these hungry families. Currently, it has a low price in most markets at \$.09 per 0.1 Kilogram (Price of Food in the Philippines) so many families can afford to fill all of their loved ones mouths for only a small portion of their daily income. The food has also become a part of the Filipino culture.

2. Set-backs

The country of the Philippines and its population face many struggles. For one, the nation has little protection from harsh natural disasters. Also, lack of education is another huge setback for the country. Out of the entire population, 20% of the school aged children are not in school (Extreme Poverty in the Philippines). For that 20%, it will be incredibly difficult for them to be able to pursue a job in their future that would give them a better life than the one they were born into.

3. Current food situation

Like many Asian countries, rice is a staple food. It is often eaten with every meal for multiple reasons. For one being its low price. With the current cost only being \$0.09 per 0.1 Kilogram (Food Prices in Philippines), many families can easily afford it. Also, parents of children grew up eating it, as did their parents so there is also a cultural aspect to it. This grain is so widely consumed that on average, each household consumes 568 Kilograms annually (INFOGRAPHIC: How Much Rice Do Filipinos Consume?). The only issue with this seemingly wonder food is that there are very few nutrients within each grain. The food is high in carbohydrates and iron but lacks many essential nutrients such as vitamins and minerals. One of the most important vitamins that many filipinos are lacking is vitamin A. On record, 52% of children under the age of 16 are considered vitamin A deficient (Micronutrient Deficiencies). This number is extremely alarming and must be brought down.

4. Filipino need for Vitamin A

Vitamin A deficiency is one of the most devastating forms of malnutrition in forming countries. This dietary syndrome can eventually lead to permanent vision loss, stunted growth, and a weakened immune system. An estimated 25,000-50,000 children go blind from the deficiency every year. This vitamin is often found in green leafy vegetables, sweet potatoes, corn, and carrots. (Vitamin A Deficiency and Attributable Mortality among Under-5-year-olds) Figuring out ways to grow these foods natively or finding an inexpensive way to ship them wouldn't be the biggest issue. Finding a way to convince people to eat them is. Most people tend to not stray far from tradition and when something new arises, it is often treated with much suspicion or is avoided completely. Being blind or having stunted growth in an area where it is already such a struggle to find work will put people with the deficiency at an extreme disadvantage. Also, having a weakened immune system leads to a higher chance of mortality.

This condition is potentially easily controlled. If a common food in the Filipino diet had vitamin A introduced into it, hundreds of thousands of children could be saved. Improved vitamin A consumption could eventually lead to the reduction of an estimated 1.3-2.5 million deaths of infants and young children (Vitamin A Deficiency in the Philippines: A Study of Xerophthalmia in Cebu). If vitamin A deficiency is controlled, children will live through a healthy adulthood and will be able to have the gift of sight. Having a healthy childhood could potentially lead to having an education and leaving the poverty they grew up in.

Currently, the main problem isn't getting vitamin A rich food over to the Philippines, it's making sure that it is affordable for the public and that they actually will buy it. Many families don't see the point of spending \$1 on a few carrots when that dollar could be spent on a much larger mass of food. Parents

understand that their children need the vital nutrients but they simply cannot afford it. They cannot afford vegetables to cook in with their rice so they are forced to do nothing about the impending doom.

5. Golden Rice as a solution

For children and adults suffering, a genetically modified form of their most popular food may be the best answer. Golden Rice was originally created to solve this exact problem. The rice was lab created to have a yellow hue, a beta-carotene, that indicated the presence of vitamin A. The rice is also capable of being grown on the islands so importing wouldn't be an issue. Also, the golden rice is close to the same price as the traditional rice that everyone eats. For only pennies more, many people would be able to live their life to a much greater quality. If this modified rice would be implemented into their diets, it could change their lives for the better.

Since this plant is genetically modified, it has more benefits besides the nutrients. Golden Rice, like many other GMO plants, are also much more efficient when being grown. The grains themselves are much more resistant to parasites so not as many herbicides need to be used. Also, they do not need as much water as the traditional plants need. Both of these traits can save farmers in poverty a lot of money which can aid them in getting out of their situation.

Golden Rice currently exists and has been created and funded by the Golden Rice Project, with two men named Ingo Potrykus and Peter Beyer co-inventing the variety of rice. Initially, the company intended to be profit based but, when the rice went to market it did not sell well enough for the company to continue production. (How 'Golden' Rice Will Save Millions of Lives) Now, other smaller start up companies are attempting to either try making a profit by using different tactics to sell or are more charity based and are nonprofit. The research behind creating a rice with beta-carotenes is very expensive and time consuming so funding from various sources such as Kickstart would be essential. Greenpeace was against funding the project because they did not believe that children could eat enough of the rice to get the daily recommended amount of vitamin A (How 'Golden' Rice Will Save Millions of Lives) but, with more development and research the rice could potentially have much more beta-carotene and would be as nutrient rich as a supplement. If Greenpeace helped fund the project, it would progress much faster. I believe that if small charities and public benefit corporations worked to make the Golden Rice Project come up with a better product, then the project could potentially receive funding from different and firms with more power such as Greenpeace, World Health Organization, or the World Bank.

This solution is currently the most promising idea. Because the rice is produced through genetic modification, it can be created and altered much quicker than other ways of creating a new species. Also, it is inexpensive for the public to buy, rather than having to spend more money than families have on supplements. Also, if the vitamin is in the rice, it will be absorbed into the body better than if it was in a pill. This method can also be utilized by people of all ages, instead of just children.

6. Ethical concerns of golden rice

Even though there are many good possibilities with golden rice, there are many ethical concerns that people have with it. There was one situation that occurred where there was some testing in China when mothers were not told that the rice that their children were testing was genetically modified. When they

found out, they were infuriated. The mothers all felt as if their children were 'guinea pigs' and were potentially in danger (In A Grain Of Golden Rice, A World Of Controversy Over GMO Foods). This incident gave the golden rice and many other GMO foods a bad rep. After this incident many people in china and other surrounding countries tore up test crops of the grain to attempt to end the project (Anti-GMO Activists Lie About Attack on Rice Crop (and About So Many Other Things))

There is also the concern that it is not natural. Many people believe that since the breed of rice was created in a lab it is unsafe. Although there is no proof that the grain is harmful to people, there is little evidence that it is safe. People are scared of what a seemingly fake plant would do to them so they avoid it even when they know the possible benefits. Some believe that since the genes in the plants are modified, it will modify the genes in their own bodies if they consume it. There is no evidence for this, but it still deters many people from buying and consuming the golden rice. (The Misleading War on GMOs: The Food Is Safe. The Rhetoric Is Dangerous)

7. Other possible solutions

There are many other plausible solutions to ending vitamin A deprivation in the Philippines. One solution is the promotion of breastfeeding to an older age. Breast milk is incredibly high in vitamin A, so that is potentially the best source of getting infants vitamin A. When young children are being weaned from their mothers, they are often fed a mixture of mashed rice and water instead of milk. This mixture does not contain the essential nutrients so it does not meet the infants dietary needs. Breastfeeding is also free so it is a very good way for mothers to get their young children all of the essential nutrients without having to spend money they don't have. This method is very effective for infants but, is not plausible for older children and adults so another method must arise. This solution could be passed along at various hospitals and clinics throughout the country. Having it be spoken about on the radio would be another way to get this out to mothers. This method of communication would be much more effective than showing it on television since the targeted families usually can't afford a television and they rely on radio for a source of less expensive entertainment. There has already been much debate over potentially banning ads for baby formula in attempt to promote breastfeeding.

Since there are so many ethical concerns with Golden Rice, many people are being forced into thinking outside of the box to create new solutions. I personally believe that a similar plant could be created through crossbreeding. Crossbreeding is where humans select the organisms with the most desirable traits and continue to breed the ones with the most pronounced specific trait to eventually reach a specific end goal for the new organism. This process is very slow because of various stages that have to occur before a plant can be reproduced such as germination time, waiting for plants to reach maturity to be able to breed, waiting to be able to harvest the seeds, and other time consuming stages. The process to create a new species can take weeks to decades, and with rice having a long germination and maturity cycle, it is believed that it would be on the longer side of how long it would take to create a finished product. There is no effective way to speed these stages up so that is why this idea is deemed less effective than genetic modification. This idea would sit much better with many potential consumers because nothing was done unnaturally. Plants have been crossbred with each other for years to create better, healthier crops and no one has been concerned with it. It's similar to what happens naturally, just in a controlled setting. This would be much more expensive and slower but, if it helps more people that's all that matters in the end.

A variety of rice called Black Rice has been created through cross breeding, but has the same issues as golden rice with people refusing to eat it because it looks so different from the traditional white rice. (*GMO Debate Grows over Golden Rice in the Philippine*) People dying of vitamin A deficiency do not have time to wait for crossbreeding to take its path, so that is why genetic modification is preferable.

Vitamin A supplements are also another feasible idea. This seems like the easiest and most direct way to give malnourished people nutrition but, there are many downsides. For one, distributing the pills would be very difficult. Most people would be unable to afford the medicine so the only way of receiving them would be from free clinics. Many struggling people do not have reliable transportation so getting to the clinics would be a challenge in itself unless one was fortunate enough to live close to one. The Food Nutrition Bulletin described a study where children under five were given supplements. Initially they seemed to help but, since there was limited funding for the pills and most families couldn't regularly travel to receive more, it was deemed unsuccessful and not a good solution for the issue. (*The National Vitamin A Supplementation Program and Subclinical Vitamin A Deficiency among Preschool Children in the Philippines*)

8. Conclusion

Overall, I believe that crossbreeding and genetic modification are the two best solutions for vitamin A deficiency in the Philippines. Both solutions give a very good and potent end product and have their own positives and negatives. It wouldn't cost very much to buy the newly crossbred rice at market, but creating the plant through GMOs or not, would cost a lot of money that the Filipinos don't have. On the other hand, The Golden Rice Project has already created the plant and have tested it in both growing and in selling the rice. Modifications to this species of rice is very quick and relatively easily manipulated to come up with a different and better end product. Through different online fundraising possibilities, I do believe that creating an effective Golden Rice will potentially be a life changing reality in the near future.

Works Cited

"Breast-Milk Battle Reaches Philippine High Court." *NBCNews.com*, NBCUniversal News Group, 19 June 2007,
www.nbcnews.com/id/19315381/ns/health-womens_health/t/breast-milk-battle-reaches-philippine-high-court/.

Courtesy www.openwebdesign.org / Modified: Jorge Mayer. "Golden Rice Project." *Vitamin A Deficiency*. N.p., n.d. Web. 09 Feb. 2017.

"Extreme Poverty in the Philippines." *U.S. Agency for International Development*. N.p., n.d. Web. 09 Feb. 2017.

"Food Prices in Philippines." *Cost of Living*. N.p., n.d. Web. 09 Feb. 2017.

<https://www.facebook.com/jhgavilan>. "SWS: More Filipino Families Suffer from Hunger in Q3 2015." *Rappler*. N.p., n.d. Web. 09 Feb. 2017.

"In A Grain Of Golden Rice, A World Of Controversy Over GMO Foods." *NPR*. NPR, n.d. Web. 09 Feb. 2017.

"INFOGRAPHIC: How Much Rice Do Filipinos Consume?" *Rappler*. N.p., n.d. Web. 09 Feb. 2017.

Lomborg, Bjørn. "How 'Golden' Rice Will Save Millions of Lives." *Slate Magazine*, 17 Feb. 2013,
www.slate.com/articles/health_and_science/project_syndicate0/2013/02/gm_food_golden_rice_will_save_millions_of_people_from_vitamin_a_deficiency.html.

Lynas, Mark. "Anti-GMO Activists Lie About Attack on Rice Crop (and About So Many Other Things)." *Slate Magazine*, 26 Aug. 2013,
www.slate.com/blogs/future_tense/2013/08/26/golden_rice_attack_in_philippines_anti_gmo_activists_lie_about_protest_and.html.

"Micronutrient Deficiencies." *WHO*. World Health Organization, n.d. Web. 09 Feb. 2017. N.p., n.d. Web.

"Philippine Statistics Authority." *Poverty Incidence among Filipinos Registered at 26.3%, as of First Semester of 2015 - PSA | Philippine Statistics Authority*. N.p., n.d. Web. 09 Feb. 2017.

PBS, director. *GMO Debate Grows over Golden Rice in the Philippines*. PBS News Hour, 2014.

Pedro, M R, et al. "The National Vitamin A Supplementation Program and Subclinical Vitamin A Deficiency among Preschool Children in the Philippines." *Food and Nutrition Bulletin*, U.S. National Library of Medicine, Dec. 2004, www.ncbi.nlm.nih.gov/pubmed/15646309.

"Poverty in the Philippines." *The Borgen Project*. N.p., 06 Feb. 2016. Web. 09 Feb. 2017.

"Rice, White, Long-grain, Regular, Cooked Nutrition Facts & Calories." *Rice, White, Long-grain, Regular, Cooked Nutrition Facts & Calories*. N.p., n.d. Web. 09 Feb. 2017.

"Vitamin A Deficiency and Attributable Mortality among Under-5-year-olds." *Bulletin of the World Health Organization*. U.S. National Library of Medicine, n.d. Web. 09 Feb. 2017.

"Vitamin A Deficiency in the Philippines: A Study of Xerophthalmia in Cebu." *The American Journal of Clinical Nutrition*. U.S. National Library of Medicine, n.d. Web. 09 Feb. 2017.

Saletan, William. "The Misleading War on GMOs: The Food Is Safe. The Rhetoric Is Dangerous." *Slate Magazine*, 15 July 2015, www.slate.com/articles/health_and_science/science/2015/07/are_gmos_safe_yes_the_case_against_them_is_full_of_fraud_lies_and_errors.html.

"The World Factbook: PHILIPPINES." *Central Intelligence Agency*. Central Intelligence Agency, 12 Jan. 2017. Web. 09 Feb. 2017.