

A SYNTHESIS ON STATUS OF FOOD FORTIFICATION IN RWANDA

Prepared for the Voice for Change Partnership (V4CP) by:

Paul Guthiga and Leonard Kirui

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Terminologies and Scope of Review

What is food fortification?

Food fortification is defined as the practice of deliberately increasing the content of essential micronutrients – that is to say, vitamins and minerals (including trace elements) – in a food so as to improve the nutritional quality of the food supply and to provide a public health benefit with minimal risk to health, (Allen et al. 2006). The objective of fortification is to increase the consumption of vitamins and minerals to improve nutritional status, leading to the prevention, control or elimination of dietary deficiencies and their disorders.

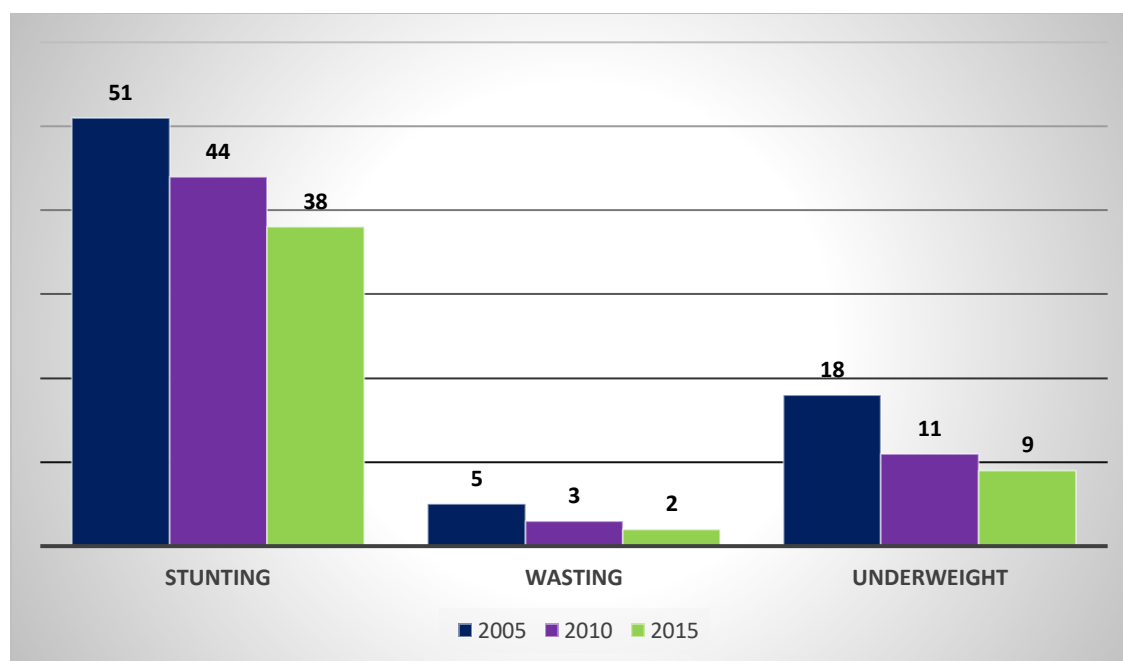
Types of fortification

Several types of commercial fortification programs are in place in countries around the world. They include mass fortification, targeted fortification, voluntary fortification, and mandatory fortification. Mass fortification refers to the addition of nutrients to foods that are generally consumed by all segments of the population (Allen et al., 2006), for example wheat flour or rice. It is the preferred approach when a majority of the population is at risk for a particular nutrient deficiency. Targeted fortification is when a particular group within a population, e.g. infants, has a unique risk for nutrient deficiency. An example of targeted fortification would be the addition of nutrients to infant formulas or infant cereals (Allen et al., 2006). Voluntary fortification is where a food company voluntarily adds nutrients to a food that is not mandated by the government to be fortified (Allen et al., 2006). Governments may issue regulations that define the concentrations and types of nutrients that may be added and the foods that are approved for nutrient addition without mandating that the foods be fortified (Allen et al., 2006). There are many examples of voluntary fortification, for example in many countries processed breakfast cereals are voluntarily fortified. Mandatory fortification is where governments issue laws or regulations that require the fortification of certain foods (Allen et al., 2006). This type of fortification is typically implemented in countries where there is documented evidence of widespread nutrient deficiency diseases or low intakes of a particular nutrient. Mandatory fortification is preferred when there is a clear public health need and where consumer knowledge about nutrition is limited (Allen et al., 2006).

The issue

Food and adequate diet is an important contributor to health and well-being (Block et al., 2011). A diverse and balanced diet helps people maintain good health; yet systematic shortcomings in nutrient supply exist at the societal level. For example, while Rwanda has made strides in improving food security, the country faces severe challenges with regards to nutrition, particularly among children under 5 years of age. Child undernutrition in the form of stunting—low height for age—is the most common form of undernutrition. This results in both short and long-term consequences such as low school attainment, low productivity as an adult, and low lifetime earning potential (Hoddinott et al. 2013). In Rwanda, the prevalence of child under-5 stunting, or low height for age, has dropped from 51 to 38 percent between 2005 and 2015 (Figure 1). However, even with these improvements, chronic malnutrition is still far too high, with disparities that overwhelmingly affect rural children: 47 percent of rural children are stunted, as compared with 27 percent of urban children. The social and economic costs to undernutrition are also huge in Rwanda. According to the Cost of Hunger in Rwanda study, the total losses associated with undernutrition are estimated at US\$820 million—equivalent to 11.5 percent of GDP in 2012 (WFP 2014). The loss in potential productivity as a result of undernutrition-related mortalities represented the highest costs. Further, Rwanda loses nearly US\$50 million annually due to vitamin and mineral deficiencies (World Bank, 2013). The remarkable magnitude of these deficiencies and the associated cost are evident despite significant scientific, economic, and technological advances over the past 30 years.

Figure 1: Percentage trends in nutritional status of children under age 5



Source: RDHS, (2015)

What is the solution

The widespread deficiencies in micronutrients (vitamins and minerals) among the Rwandan population can be prevented and even eliminated if these essential nutrients are consumed on a continuous and ongoing basis. Fortification of commonly eaten staple foods and condiments with essential vitamins and minerals could be an important part of the solution. Fortification may be used as a tool to correct or prevent widespread nutrient inadequacies and, hence, correct associated micronutrient deficiencies to balance the total nutrient profile of diets, to restore nutrients lost in food processing, or to make products more appealing to consumers. Food fortification has the potential to significantly benefit the nutritional wellbeing of large segments of populations. In a 1994 report, the World Bank stated the following about food fortification: “No other technology offers as large an opportunity to improve lives at such low cost and in such a short time.” (World Bank, 1994). Today, there are hundreds of millions of people who could benefit from fortified foods but do not have access to them. Indeed, Rwanda is among the countries where only a small fraction of staple foods that are fortifiable are fortified.

We know fortification works - Effectiveness/Best Practices

To put fortification in perspective, it is useful to briefly review its effectiveness and best practices. The evidence of effectiveness of food fortification is strong in developed countries and growing

rapidly in LMICs. The most successful global fortification experience is the fortification of salt with iodine. More than 110 countries have successfully iodized their salt supplies, thus reducing goiter and cretinism, preventing mental retardation and subclinical iodine deficiency disorders, and contributing to improving national productivity. Salt iodization levels are more than 80% in some of the sub-Saharan African countries including Nigeria, Madagascar, Eritrea and Cameroon.

Indonesian Ministry of Health demonstrated significant potential for increasing vitamin A uptake through fortified cooking oil, spurring the formation of a coalition of government officials, the oil industry association, leading nutritionists, and non-governmental organisations to pursue large scale fortification in the country with a grant from GAIN in 2010. From 2011 to 2012, a study was conducted in two districts in West Java to assess the effects of large-scale fortification on the vitamin A status of women and children. The results showed that fortified oil helped bring vitamin A intake closer to recommended nutrient intakes, contributing on average 26 percent of daily need for children aged 12 to 23 months, 38 to 40 percent among older children, and 29 to 35 percent for women. The vitamin A status of all beneficiaries improved from 2011 to 2012, as did the vitamin A content of breast milk of lactating mothers. Deficiency dropped significantly during this time, falling from 6.5 to 18 percent to 0.6 to 6 percent. Based on these results, Indonesia's Ministry of Industry mandated oil fortification with vitamin A in 2014.

Costa Rica has a long history of food fortification, starting in 1958 with adding iron to their wheat flour. The country fortifies a range of other foods, including iodizing salt since 1972, and later, expanding to include milk, maize flour, rice, and sugar. An evaluation of the impact of iron fortification revealed a significant decrease nationally in the prevalence of anaemia in children and women. Anaemia was reduced from 19 to 4 percent in children and from 18 to 10 percent in women. In children, iron deficiency was also reduced from 27 to 7 percent. As one of the earliest low- and middle-income countries to implement fortification efforts, the results Costa Rica has achieved suggest significant potential for impact when programs are designed, implemented, and monitored adequately.

In 2008, Ethiopia government in partnership with GAIN, UNICEF, Micronutrient Initiative, and the country's salt producers, began working to increase the availability and access to adequately iodized salt. The combination of advocacy and technical support from development resulted in the passing of new legislation on the mandatory iodization of salt in March 2011. Salt iodization

across the country started to rapidly increase and as of 2014, 95 percent of households had access to salt with some iodine.

To address high rates of undernutrition, anaemia, and vitamin A deficiency in Burundi, the government took steps to implement a national food fortification program with support from Project Healthy Children. In 2011, Burundi put fortification on the national agenda and adopted the East African Community's fortification standards. A National Fortification Alliance was formed to build support among the various public and private sector stakeholders. When political turmoil delayed the signing of the legislative decree that would make fortification mandatory, the private sector forged ahead anyway. Premix companies DSM Nutritional Products and BASF donated the initial vitamin A premix and testing equipment needed for Burundi's only cooking oil facility, Savoror, to begin fortifying cooking oil. The Burundi Bureau of Standards began to work closely with industry staff to establish internal monitoring systems to ensure compliance with the national cooking oil standards. Fortified oil can already be found in markets throughout the country and is also being provided to the capital's internally displaced people. More work is needed to get fortification legislation passed and build an effective national monitoring system in the country, but the high level of commitment shown by the private sector in Burundi is promising for successful fortification efforts, ([http://projecthealthychildren.org/where-we-work/burundi/.](http://projecthealthychildren.org/where-we-work/burundi/))

In Kenya, food fortification dates back to 1972 when voluntary salt iodization began. In 1978, the government of Kenya made the iodization of salt mandatory. This has led to decline in the prevalence of total goiter from 35% in 1999 to 6% in 2004 (KEMRI and UNICEF 2004). The last decade has seen increased efforts and resources directed towards shifting from voluntary to mandatory fortification. The amendment of the Food, Drugs and Chemical Substances Act of the Laws of Kenya CAP 254, Notice No 62 of June 2012, Kenya, provided for addition of vitamin A (retinol) in vegetable oils and fats, as well as the addition of vitamin A (retinol), iron and zinc among other micronutrients in wheat and maize flours (GoK 2012). A second amendment was undertaken in July 2015 under CAP 254, Notice No. 157 to include fortification standards for wheat flour, maize flour and edible oil and fats (GoK 2015). In 2012, Kenya adopted East African Community (EAC) standards that were developed in 2006. This aimed at harmonizing requirements that govern food commodity trade for vegetable oil and fats (fortification with

vitamin A), wheat and maize flour (fortification with iron, zinc, folic acid, niacin, vitamin B1 and B12 and vitamin A). By 2006, standards for iodization of salt were already in place.

The status of food fortification in Rwanda

In general, food fortification in Rwanda is an ongoing programme. In 2007 the National Nutrition Policy (NNP) 2007 proposed national supplies of therapeutic food products for acute malnutrition, and expansion of micronutrient fortified staples and special food products to use in emergencies and food programmes supplementing most vulnerable including those infected and affected by HIV/AIDS. Among the priorities of the 2007 NNP included fortification of staples and vitamin and mineral supplementation targeted to specific young children and pregnant women. In 2013 the Government of Rwanda approved standards for national mandatory fortification of industrially milled wheat and maize flour, cooking oil, sugar and salt. Staple foods of these types, both produced in Rwanda and imported, must contain specific amounts of appropriate micronutrients. The National Food and Nutrition also proposed potential solutions for preventing and controlling iron deficiency anaemia for different groups in Rwanda. They include:

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Staples fortification: According to the National Fortification Alliance, legislation passed in 2013 requires that staple foods for the general population be fortified with appropriate micronutrients beginning in 2014. While this will help with overall micronutrient nutrition staples fortification, including fortifying wheat and maize flour with iron, it will not fully address the iron deficiency problems of those who do not consume commercially milled flours of those who have high iron needs (pregnant women and young children).

Use of biofortified crops: Rwanda has moved forward with research and trials of biofortified agricultural crops including biofortified beans. The bean varieties have been shown to be acceptable to farmers, have substantially higher yields and high levels of iron. Broad sales of these beans in Rwanda began in 2013 and other biofortified crops are also being promoted including varieties of cassava and sweet potatoes.

Targeted fortification: Some commercially prepared foods are highly fortified with micronutrients in amounts that can meet the needs of young children and pregnant women. Such foods are available for purchase as complementary cereals. Similarly, fortified foods are prepared

or imported in bulk packaging for use to supplement the food of pregnant women and young children in emergencies and refugee situations, to treat moderate malnutrition and to supplement the diet of highly vulnerable groups including PLHIV (children and mothers). In Rwanda, Africa Improved Foods (AIF) is a partner in one of the world's largest anti-stunting programmes. Their contribution to the programme, which is led by the Ministry of Health, is Shisha Kibondo. There are two types of Shisha Kibondo; one for infants and the other for pregnant and breastfeeding mothers. The goal of the programme is to tackle Rwanda's high stunting rates by making Shisha Kibondo available for free to all pregnant and breastfeeding mothers and infants older than 6 months through all district health centres. Only mothers and infants in Rwanda's "Ubudehe 1" income category are eligible, meaning the poorest Rwandan mothers can now ensure their children receive the right nutrition during the first 1,000 days of their lives. In 2017, Shisha Kibondo was distributed for free to 74,916 vulnerable mothers and 15,344 vulnerable 6-23 months old infants. In 2017, AIF also provided 3.5 million nutritious porridge meals to 46 Rwandan district hospitals. These products were specially formulated to address nutrient deficiencies inherent to HIV/AIDS patients.

In-home fortification: In-home fortification of complementary foods for young children using small sachets of micronutrient powders (MNP) that are mixed with locally available complementary foods has been shown to be acceptable to mothers and to help prevent and control iron deficiency among young children in Rwanda. This innovation has the potential to solve the extremely high anaemia prevalence in the 6-24-month age group. Successful operational research was complete in six districts in 2013. The use of MNP expanded quickly because the intervention was included in community level nutrition programmes with funding by Development Partners. With the nationwide scale-up of MNPs, Rwanda is closer than ever to guaranteeing its children a healthy and prosperous future. While the integrated point-of-use fortification programme is reaching every district, work remains to improve coverage and ensure that no child is left behind. Sustaining this intervention will require substantial advocacy to assure ongoing funding of the necessary products as well as its widespread commercial availability at low price.

Big gaps remain

Lack of appropriate data: Currently there is no database in Rwanda where all the details regarding food fortification can be obtained to help in determining the production capacities,

market dynamics, consumption levels as well as policy and legal frameworks in place. Generally, the lack of adequate information on food consumption patterns is still an issue in Rwanda and may pose as a major impediment to the development of fortification programs. Indeed, the absences of this information in full measure can easily slowdown the needed efforts needed to secure the needed fortification.

Poor enforcement of policies, regulations and standards: Evidence has shown that mandatory food fortification works. Large scale food fortification programs can make a major contribution towards improving the quality of diets at the population level resulting in better nutrition which directly contributes to the achievement of some of the key Sustainable Development Goals¹.

However, in order for a country to reap all its health, social and economic benefits, government must create an enabling environment, which includes strong legislation, evidence-based standards and sustainable quality control/quality assurance and enforcement systems.

There are a number of gaps in the policy and legal framework governing food fortification in Rwanda. For examples, there are no regulations or law for mandatory fortification. There are only standards that guide factories desiring to fortify products such as maize, wheat milled flour, salt and cooking oil. The Legislative Order no 57/A.E. of 10/05/1940 establishing regulations of commerce, detention and consumption of foodstuffs is silent on food fortification. The legislative order need to be amended to include provision for fortified products. The Law No 47/2012 of 14/01/2013 regulating food and pharmaceutical products provides for an Order of the Minister to set out instructions regulating food products and their composition (Article 5) but it is also silent about fortification. Again, the Presidential Order No. 67/01 of 20/10/2009 on Food Supplements does not cover food fortification. The Ministerial instructions/decrees on fortification has remained in draft form since 2013. As of 2019, 132 countries have enacted mandatory legislation for mass fortification of either wheat, maize, or rice. Rwanda is the only exception as it has initiated voluntary fortification solely for maize flour, (Baqir *et al.*, 2019)

Lack of adequate information: There is limited information in almost all aspects surrounding food fortification in Rwanda ranging from the policy makers, to producers and the consumers.

¹ <http://scalingupnutrition.org/nutrition/nutrition-and-the-sustainable-development-goals/>

For example, most of the consumers and traders do not have adequate information on fortified foods and their importance on human wellbeing. The few stakeholders who have information are not in position to adequately share or put it out appropriately to the public.

Low purchasing power and high cost of equipment: Currently, there is limited supply of fortified food due to low demand. Only three food processing companies are producing fortified foods in Rwanda. They include; (1) SOSOMA Industries Ltd; (2) Africa Improved Foods (AIF); and (3) MINIMEX. On average, AIF produce 15 tonnes of Nootri products per month while MINIMEX produce an average of 10 tonnes per month. The low production levels are associated with high cost of production and limited demand. Currently most of the products from these companies are very scarce and hardly found in the market. Primary bottlenecks for private sector and importers (across scale) are premix costs equipment running costs. For example, import duties/taxes on premixes or fortification equipment can result in higher prices for fortified produce and can deter the private sector from investing, (Pachón *et al.*, 2015)

Inefficient coordination of partners and stakeholders in food fortification industry: The private sector has established the National Food Fortification Alliance under the auspices of the National Food and Nutrition Technical Working Group. Even with the creation of the National Food fortification Alliance, there is evidence that public sector-led fortification programs have been successful in a number of countries largely as a result of mandatory fortification (legislation), enforceable regulation and a mixture of incentives, (Milani *et al.*, 2017). Despite the fact that the engagement of the private sector is vital, it is argued this on its own is not enough and governments often need to take a stronger role (in lieu of a strong private sector) and bear some of the risk, (Forsman *et al.*, 2014).

So, what is the strategy?

Enhancing the enabling environment: Advocacy efforts to raise awareness of the effects of micronutrient deficiencies and the benefits of fortification programs are essential to generate the political will to make long-term commitments to effective fortification efforts. Successful fortification programs require both strong government leadership and a motivated private sector. The private sector is usually willing to engage in fortification as long as there is a level playing field. Consumer demand for nutritious products is limited in low- and middle-income countries where many food products are not branded or packaged. Companies often want mandatory

fortification to ensure that they all incur equitable costs. This needs adequate monitoring from all governments. By mandating fortification through legislation and providing adequate enforcement, governments can provide a common set of rules. Mandatory fortification has been shown to reach a higher proportion of the population and resulting health benefits are distributed more evenly, (Greiner, 2007).

Increasing the Role of Civil Society: Fortified foods are considered credence goods, those that consumers cannot easily evaluate in order to demand a higher quality. Fortified and non-fortified products are virtually identical and without the use of some form of analytical equipment, consumers have little indication as to whether vitamins and minerals have been added in the declared amounts or will perform as claimed. They must take the stated claims of manufacturers on faith. This same information asymmetry can also describe the relationship between fortified food producers and their micronutrient premix suppliers. For some credence goods, including fortified foods, product demand depends largely on branding and marketing to provide consumers with a recognizable way to distinguish between products, (Gönül *et al.*, 2001). Since consumers are easily cheated into paying higher prices for claims of higher-quality products, there is little market incentive for food producers to invest in improvements to increase the quality of their products. Food producers who wish to pawn off lower-quality goods as higher ones will therefore drive out legitimate business, (Akerlof, 1970). The burden for increasing incentives to invest in fortification (and food quality more broadly), therefore, largely falls on regulatory agencies. As success stories from respondents detail, regulatory agencies have benefited from working with civil society organizations, including industry and consumer associations. There have been documented successes where village health committees helped to monitor small and local retailers (Schüth *et al.*, 2005). Civil society can be a powerful watchdog, improving consumer awareness of those food producers that pass off their underfortified products as good consumer choices. Civil society can also be an important regulatory assistant, lessening the financial and workload burden of the national regulatory offices as a stopgap measure until local offices can be built and properly staffed, (Pearson *et al.*, 2015).

Conclusion and recommendations

The importance of strong legislation which includes quality assurance and compliance monitoring and failure to reach poorer segments of society due to price are key lessons. The legal framework within which the business model resides is imperative as this has a bearing on implementation and should include the food vehicle being fortified, micronutrients specifications/procedures, and responsibility of fortification (mandatory or voluntary) including procedures for quality control and compliance. However, almost all texts point to the greater success of projects where fortification is mandatory and adequately monitored and regulated. Supporting project with more regulation seems to yield greater success, so this highlights the strength of fortification efforts based on mandatory inclusions.

Primary bottlenecks for private sector and importers (across scale) are premix costs equipment running costs. For example, import duties/taxes on premixes or fortification equipment can result in higher prices for fortified produce and can deter the private sector from investing.

Specifically, this review recommends the following:

1. **Legislation:** Develop and implement clear legislation that outlines roles and responsibilities of all stakeholders, provides an enabling environment within the private and public sectors, and includes applicable enforcement mechanisms.
2. **Leadership:** Identify strong leadership within government and the private sector that facilitates the prioritization of fortification programming and subsequent enforcement and national budget allocations.
3. **Community:** Engage civil society and community organizations as a third-party to build consumer support and knowledge and to reduce the regulatory resource burden.
4. **Data Capture:** Simplify regulatory monitoring management processes, including streamlined data collection and feedback mechanisms for action.

References

- Allen, L., de Benoist, B., Dary, O., Hurrell, R., 2006. Guidelines on Food Fortification with Micronutrients. World Health Organization and Food and Agricultural Organization of the United Nations.
- Fleischhacker S. (2019) Food Fortification in a Globalized World: *Journal of Nutrition Education and Behavior*; 2019; 51:384
- Allen, Lindsay, Bruno de Benoist, Omar Dary, and Richard Hurrell, eds. 2006. *Guidelines on Food Fortification with Micronutrients*. Geneva, Switzerland: World Health Organization and Food and Agriculture Organization.
- Milani, P.; Carnahan, E.; Kapoor, S.; Ellison, C.; Manus, C.; Spohrer, R.; Van Den Berg, G.; Wolfson, J.; Kreis, K.(2017) Social Marketing of a Fortified Staple Food at Scale: Generating Demand for Fortified Rice in Brazil. *J. Food Prod. Mark.* 23, 955–978.
- Forsman, C.; Milani, P.; Schondebare, J.A.; Matthias, D.; Guyonnet, C. (2014) Rice fortification: A comparative analysis in mandated settings. *Ann. N. Y. Acad. Sci.* 1324, 67–81
- Baqir Lalani, Aurélie Bechoff and Ben Bennett (2019) Which Choice of Delivery Model(s) Works Best to Deliver Fortified Foods? *Nutrients*, 11, 1594; doi:10.3390/nu11071594
- Pachón, H.; Spohrer, R.; Mei, Z.; Serdula, M.K. (2015) Evidence of the effectiveness of flour fortification programs on iron status and anemia: A systematic review. *Nutrition Review*, 73, 780–795.
- Greiner, T. (2007) Fortification of processed cereals should be mandatory. *Lancet*, 369, 1766–1768.
- Gönül FF, Carter F, Petrova E, Srinivasan K. (2001) Promotion of prescription drugs and its impact on physicians' choice behavior. *J Mark.* 2001;65(3):79–90. 10.1509/jmkg.65.3.79.18329
- Akerlof GA. (1970) The market for "lemons": Quality uncertainty and the market mechanism. *Q J Econ.* 1970;84(3):488–500. 10.2307/1879431

Schüth T, Jamangulova T, Janikeeva S, Tologonov T. (2005) Power from below: Enabling communities to ensure the provision of iodated salt in Kyrgyzstan. *Food Nutrition Bulletin*. 2005;26(4):366–375.

Pearson M, Zwi AB, Buckley NA, Manuweera G, Fernando R, Dawson AH, (2015). Policy making ‘under the radar’: A case study of pesticide regulation to prevent intentional poisoning in Sri Lanka. *Health Policy Plan*. 2015;30(1):56–67. [10.1093/heapol/czt096](https://doi.org/10.1093/heapol/czt096)