

TRANS FAT ELIMINATION

**FINDINGS FROM A BUSINESS TO
BUSINESS TECHNICAL ASSISTANCE
PILOT PROJECT FOR INDUSTRIALLY
PRODUCED TRANS FATTY ACIDS
(ITFA) ELIMINATION IN NIGERIA
AND PAKISTAN**

October 2020

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This report was supported by an independent consultant, Catherine Eitel Mealer

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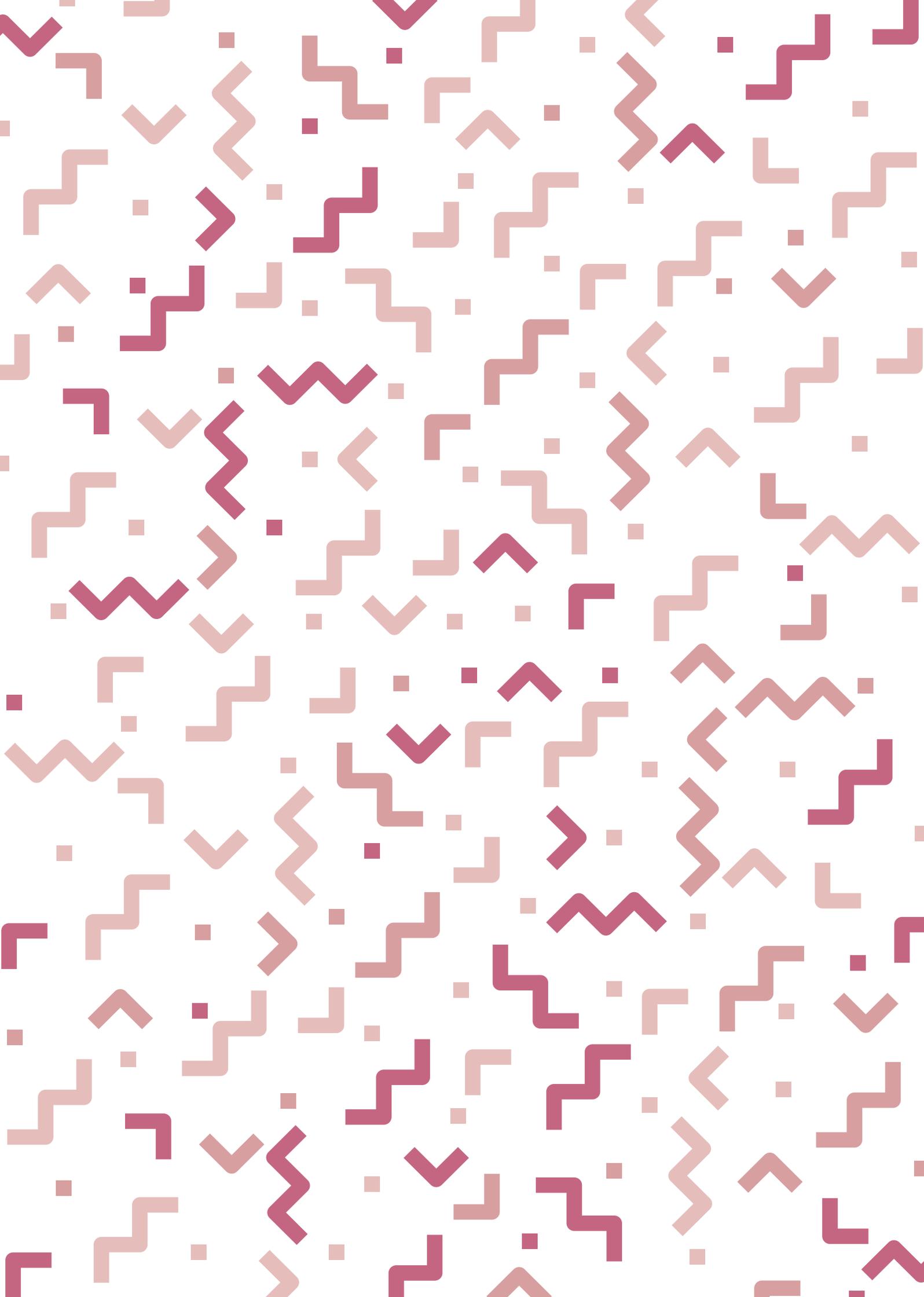


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Acronyms

B2B	Business to Business
CAFSAN	Consumer Advocacy for Food Safety and Nutrition Initiative
GAIN	Global Alliance for Improved Nutrition
IFBA	International Food and Beverage Alliance
iTFA	Industrially Produced Trans Fatty Acids
NAFDAC	National Agency for Food & Drug Administration
NCDs	Non-Communicable Diseases
NHF	Nigerian Heart Foundation
NGO	Non-Governmental Organization
PFA	Punjab Food Authority
PHO	Partially Hydrogenated Oils
PUFA	Poly-Unsaturated Fatty Acids
PSQCA	Pakistan Standards and Quality Control Authority
SBN	SUN (Scaling Up Nutrition) Business Network
SFA	Saturated Fatty Acids
TFA	Trans-fatty acids
WHO	World Health Organization

Executive Summary

Coronary heart disease is a worldwide health problem, and consumption of trans-fatty acids (TFA) is associated with increased risk of developing the disease. TFAs are unsaturated fats primarily found in industrially produced foods.¹ While originally introduced in the food industry to prolong products' shelf life and to lower refrigeration requirements, industrially produced trans fatty acids (iTFA) has since been identified by the World Health Organization (WHO) as a priority target for elimination in the global food supply chain by 2023.³

The primary strategy launched by WHO to eliminate iTFA is the REPLACE action package, which provides resources for countries and food suppliers based on six strategic action areas. These areas are specified as:

- "Review dietary sources of iTFA and the landscape required for policy change
- Promote the replacement of iTFA with healthier fats and oils
- Legislate or enact regulatory actions to eliminate iTFA
- Assess and monitor trans fat content in the food supply and changes in trans fat consumption in the population
- Create awareness of the negative health impact of TFA among policy-makers, producers, suppliers, and the public
- Enforce compliance with policies and actions."³

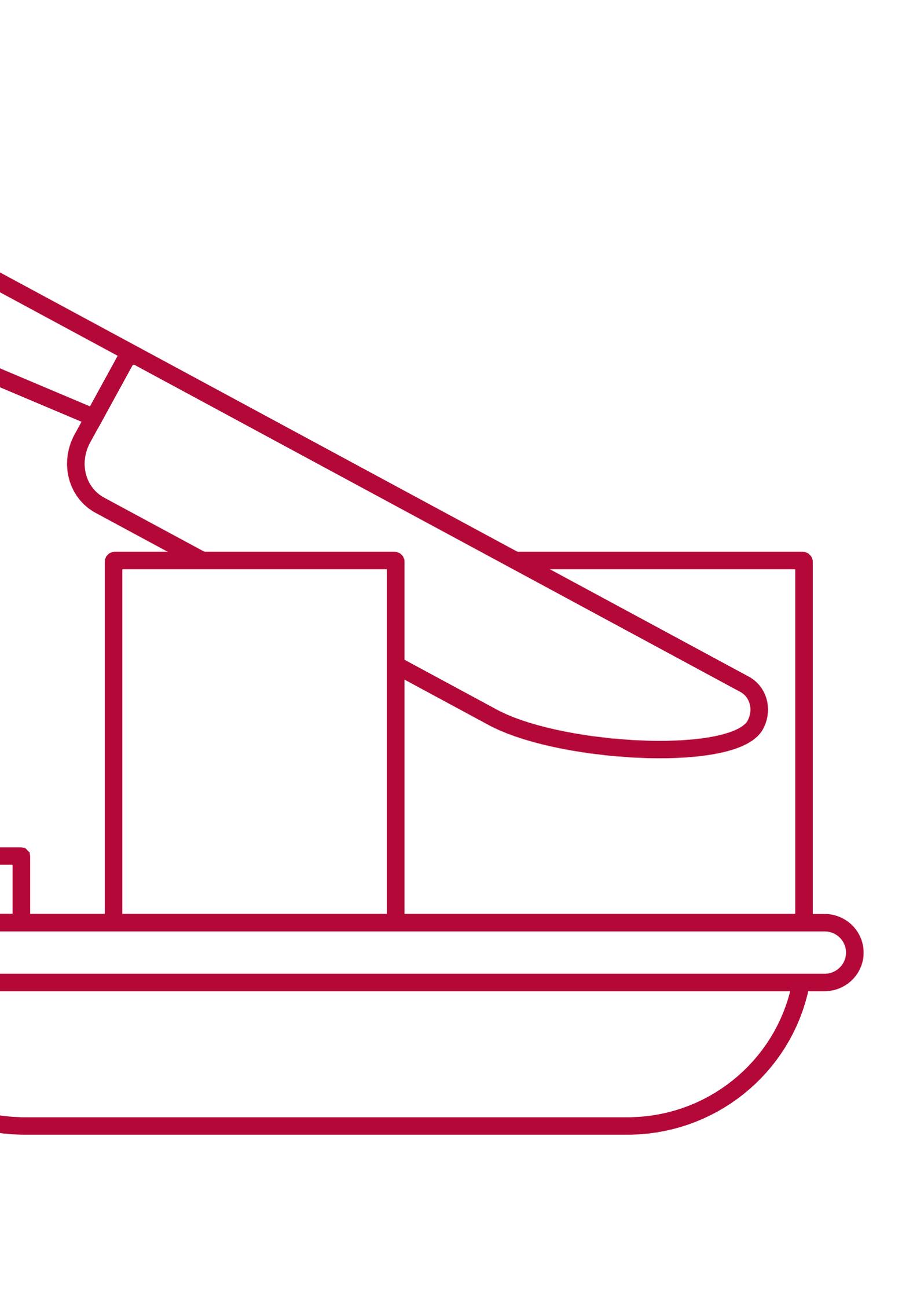
WHO works in close collaboration with Resolve to Save Lives, an initiative of Vital Strategies, to provide in-country technical and financial support to implement these evidence-based guidelines.⁴

The SUN Business Network (SBN)/Global Alliance for Improved Nutrition (GAIN), with the support of Resolve to Save Lives, has conducted a pilot project to promote the replacement of iTFA by local businesses – especially small and medium enterprises (SMEs) - in Nigeria and Pakistan. A large proportion of the labor force in emerging markets are employed by SMEs, defined as businesses having up to 250 employees.⁵ This multi-step project was designed as a business-to-business initiative aiming to leverage the expertise of the International Food and Beverage Alliance (IFBA) in iTFA replacement. The project included the following activities: research on iTFA consumption and in-country replacement solutions, organization of multiple iTFA replacement workshops, and support to companies for the identification/implementation of iTFA replacement solutions. IFBA's role has been to share best practices and guide other companies using their experience. IFBA members have removed an estimated 98.5% of iTFA from their products worldwide.⁶ According to WHO, understanding the challenges related to trans fat elimination is critical to designing effective policy change; therefore, WHO has recommended an impartial assessment of technical concerns raised by industry.⁷ This final report summarizes the outcomes, challenges, and opportunities from the pilot project led by GAIN/SBN.

To ensure elimination of iTFA from the global food supply by 2023, this report - based on assessments conducted in two countries - advises the following business-to-business and technical assistance recommendations:

- Provide more targeted and specific technical assistance to SMEs based on their products' categories (edible fats and oils, bakeries, and food manufacturers)
- Consider use of pre-recorded, virtual training accessible at any time by SMEs
- Schedule opportunities for follow-up technical assistance and support after initial training
- Create networking opportunities for local SMEs to connect and exchange ideas on iTFA elimination

This report was made by an independent consultant, Catherine Eitel Mealer, to support a pilot project on the removal of iTFA in Pakistan and Nigeria and edited by Laurene Aubert, SBN Global Partnerships Manager at GAIN prior to publication. The report was reviewed by Christina Nyhus Dhillon, Senior Technical Specialist at GAIN.



1. Background

1.1 Industrially Produced Trans-Fatty Acids, definition

TFAs are unsaturated fatty acids containing at least one double bond in the *trans* configuration. They occur naturally in meats and dairy products at low levels as the result of bacteria produced by ruminant animals. iTFAs are produced by adding hydrogen to liquid vegetable oils in an industrial process to make them solid at room temperature. This partial hydrogenation converts many of the *cis* double bonds into the *trans* formation.²

Initially used by the food industry after public health campaigns in the 1960s aimed at decreasing use of animal fat, iTFAs have been favored due to low cost, shelf-life stability, and ability to withstand repeated heating.⁸ While the initial assumption behind partial hydrogenation was to improve population-wide cardiovascular health, it is now established that TFAs are unhealthy. Therefore, current WHO dietary recommendations are to limit total trans fat intake to less than 1% of total caloric intake (<2.2 g daily in a 2000-calorie diet) as well as to replace saturated fatty acids (SFAs) with unsaturated fats. To achieve these dietary goals, WHO recommends its member States to take actions to limit iTFA to 2% of total fat in all foods or to ban Partially Hydrogenated Oils (PHO) - the main source of iTFA on food by 2023.⁹

1.2 Health Implications of Trans-Fatty Acids

Coronary heart disease is a worldwide health concern, and consumption of TFAs is associated with increased risk of developing the disease. TFAs have been shown to clog arteries and increase the risk of myocardial infarction, ischemic stroke, and type 2 diabetes. iTFA are estimated to be responsible for 540,000 deaths worldwide each year.⁴

1.2.1 Nigeria

There is a large burden of non-communicable diseases (NCDs) in Nigeria, accounting for 29% of all deaths in 2016. While the data about nationwide TFA consumption is limited, in 2010, an estimated 1,300 Nigerians died as a probable result of high TFA intake.¹⁰ Any efforts to identify and reduce dietary risks that contribute to the burden of NCDs should be made a priority.² Nigeria has the largest market for PHO in Africa,, with an estimated 8.5% consumption of Africa's total market volume.³⁵ Likely sources of iTFA in Nigeria include:

- Fast food/restaurants and eatery products: fried foods (French fries, pizza, puff puff), deep-fried fast food (akara, fried chicken), plantain chips, cheese balls, sausage rolls
- Supermarket products: ready-to-microwave popcorn, wafers, crackers, noodles, sauces and seasonings, ice cream
- Fats and oils: shortenings, partially hydrogenated oils, some margarines
- Bakery Products: doughnuts, biscuits, cookies, pastries, cakes.²

1.2.2 Pakistan

Currently, the leading cause of death in Pakistan is ischemic heart disease.¹¹ Death from ischemic heart disease disproportionately affects Pakistani men, who experience 62% increased mortality from heart disease in comparison with men of England and Wales.¹² Pakistan has the second highest intake of trans-fats in the WHO Eastern Mediterranean region following Egypt, and one of the highest trans-fat consumption worldwide.¹ Likely sources of iTFA in Pakistan include:

- Fats and oils: vanaspati ghee (a clarified butter substitute), margarines, butter, cooking oil.
- Processed food products: biscuits and cakes, chocolate and pastries, snack foods, Nimco and potato chips.

Of particular importance in the Pakistani food supply chain is vanaspati ghee. Originally created as a replacement for the animal-fat based product called desi ghee, vanaspati ghee is an inexpensive and widely used ghee made of vegetable oil(s) and containing PHO. A 2004 study noted the iTFA content in vanaspati ghee samples ranged from 14.2-34.3%.¹³

1.3 Current Government Regulations

1.3.1 Nigeria

Currently no regulations exist in Nigeria regarding the use of PHO or the level of iTFA in foods. In 2019, NAFDAC introduced a revised draft version of the 2005 Fats and Oils Regulations. These revised regulations include language prohibiting the amount of trans fats found in foods to no more than 2 grams per 100 grams of oil or fat and stricter food labeling requirements. This draft regulation was published on the NAFDAC website to solicit public comments and inputs until March 9, 2020.

1.3.2 Pakistan

The Pakistan Standards and Quality Control Authority (PSQCA), which prescribes food standards at the national level, has a national standard requiring trans-fat levels not to exceed 10% in vanaspati ghee. No standards are mentioned for products other than vanaspati ghee, and there are no penalties for non-compliance.

In addition to food regulation laws set at a national level, enforcement of food regulations falls to provincial food authorities. However, regulations differ by province. The Punjab Food Authority (PFA) has the strictest in-country regulations for trans-fats and meet WHO specifications. The local regulations limit iTFA content to a maximum of 0.5% within a set of food products, and any form of vanaspati ghee will be banned after July 2020. However, there are no penalties for non-compliance. Other provincial food authorities have very limited language regarding iTFA and do not comply with WHO recommendations.

2. Methodology

2.1 In-country mapping of iTFA replacement solutions

In-country consultants in both Nigeria and Pakistan identified and interviewed representatives of food companies using iTFA. Requests for interviews were made, and standard questions developed by the SBN global team were asked during the interview. The assessments included country specific recommendations for iTFA replacement options. These recommendations took the following into consideration for each replacement solution: local product availability, cost, health impact, and technical knowledge. The detailed findings of the two in-country mapping exercises^{2,13} have been published by GAIN/SBN and were considered for the production of this report.

2.2 In-country workshops

GAIN/SBN organized workshops in both Nigeria (29 October 2019 in Lagos, 3 March in Kano) and Pakistan (Karachi, 22-23 January 2020) to facilitate discussions between representatives from local companies, IFBA, and the public sector (government, national regulatory agencies, NGOs, etc.). These workshops included presentations and discussions regarding business to business (B2B) technical assistance options and focused on raising awareness around iTFA negative health impact and presence in the food value chain. The workshops in Lagos and Karachi gathered each more than 40 participants and more than 70 participants attended the iTFA session at the Kano workshop. The outcomes of the workshops were considered for this report.

2.3 Literature review and interviews

A desk review using Google Scholar and PubMed was conducted prior to interviews with key stakeholders and experts. Contacts were provided from GAIN/SBN offices for relevant stakeholders who signed an iTFA removal commitment form or provided B2B technical assistance at the in-country workshops hosted in late 2019 and early 2020. A total of eighteen key informant video and phone interviews were conducted with twelve SMEs, and six experts to review successes, challenges, and outcomes of the iTFA removal pilot project.

3. Findings

3.1 Awareness around iTFA

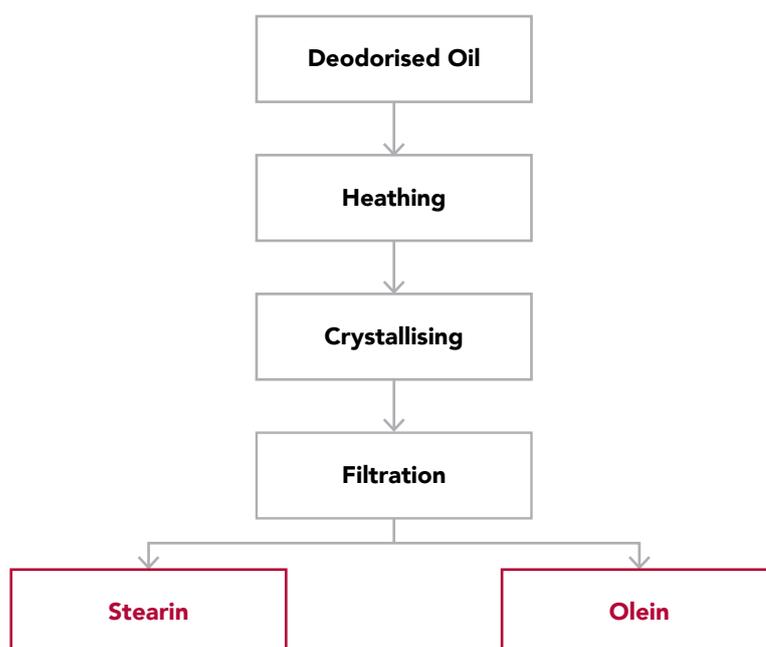
The in-country mapping exercises conducted by GAIN/SBN clearly evidenced knowledge gaps around iTFA in Nigeria and Pakistan. In Nigeria, 64.5% of the interviewees by GAIN/SBN reported having no knowledge of iTFA existence and definition. The Pakistan report also identified limited knowledge around the existence and negative health implications of iTFA. GAIN/SBN identified that companies perceive low levels of consumer awareness of the adverse health effects of iTFA. While some companies interviewed had already made investments towards iTFA elimination or reduction, most companies did not wish to invest in product reformulation changes without evidence of strong consumer demand for these products.

3.2 iTFA Replacement Options

3.2.1 Nigeria

The fractionation and blending methods were identified by GAIN/SBN initial mapping of iTFA replacement solutions in Nigeria² as the optimal iTFA replacement option for Nigeria. Fractionation involves a controlled crystallization and separation of vegetable oil. These crystallizations can be used as single fractions or in combination with other fraction blends. This approach involves simple technology and the use of raw materials available in the country (palm oil being widely available in Nigeria), and therefore has a low to moderate cost impact.²

Figure 1: Dry Fractionation Method adapted from Fractionation Plant-Ace Oils (Solvent & Oil Seed Extraction).¹⁴



The Case for Ground Nut Oil in Nigeria

Several oils were mentioned in stakeholder interviews for use in commercial food production in Nigeria, including soybean oil, palm oil, canola oil, groundnut oil, and olive oil.

One locally available Nigerian raw material is groundnut (peanut). Nigeria is one of the world's largest producers of this oilseed and food crop, accounting for 10% of total world production and 39% of total African production.

Groundnut oil is naturally trans-fat free, and high in healthy unsaturated fats. When highly refined in a process that purifies, refines, bleaches, and deodorizes the oil, it no longer contains peanut allergens.³⁶ Processing also removes the risk of toxicity from aflatoxins commonly found in moldy agricultural crops. Groundnut oil is ideal as cooking frying oil for snack foods such as potato chips due to the high monounsaturated fatty acid and tocopherol profiles. It also has a high smoke point and deteriorates to a lesser extent than other frying oils. Foods fried in peanut oil score high on sensory flavor tests such as flavor, crispness, and mouth feel.³⁷ Peanut oil manufacturers in the United States experienced an increased demand for the product when food manufacturers sought healthier alternatives to hydrogenated vegetable oils after the trans fat ban.³⁸ A representative from an American multinational food manufacturing company stated that peanut oil could be used for manufacturing, but was not used as frequently in the United States due to higher costs relative to other available sources of vegetable oils and allergy perception.

The local availability and the trans-fat free oil profile of groundnuts suggest a need for further in-country research and focused technical assistance on commercial use of groundnut oil in Nigeria. A local company in Nigeria indicated currently selling crude peanut oil directly to consumers, with a refinery machine they could promote and sell on a commercial scale. Currently, there are several ways Nigerian stakeholders are utilizing groundnut oil. One groundnut butter company interviewed stated that its company uses groundnut oil in small quantities to improve texture and improve spreadability in one of their flavored nut butters. Due to the small quantities required, the company purchases the groundnut oil at the local markets. Groundnut oil may be purchased at the local markets in pre-packaged 25L containers or consumers can bring their own containers of various sizes to purchase based on their need. Many of the oil vendors sell unbranded products. A snack food producer reported using groundnut oil to fry some of their products. He stated that groundnut oil is a low-cost product and good for frying because it is more viscous than soy oil and does not dry out the fried product.

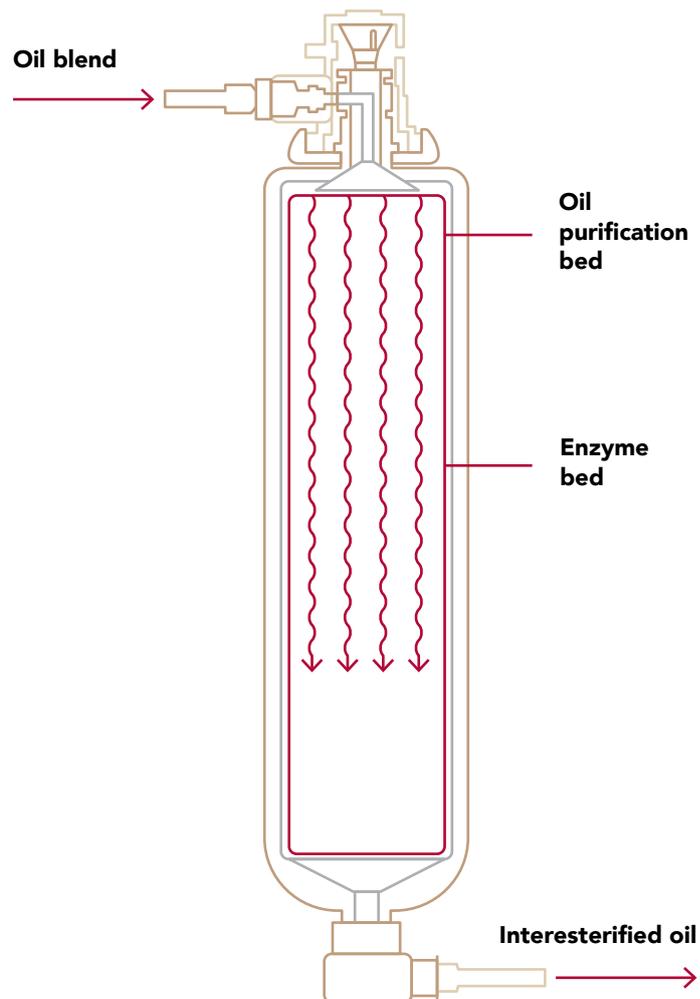
While palm oil would be another option for trans-fat free oil, groundnut oil has several advantages. Nigeria is the world's 5th largest producer of palm oil, yet the country has experienced a supply gap in recent years and relies on importation. To encourage local production, the government has added a duty charge of 35% to imports, which increases the cost of palm oil for consumers.³⁹ A Nigerian stakeholder identified the market cost of peanut oil to be 400 NGN per liter, while the cost of palm oil is 500 NGN per liter. Peanut oil is also lower in saturated fat than palm oil, and research has indicated markers of metabolic disease such as diastolic blood pressure, total cholesterol, and fasting glucose are lower among consumers of groundnut oil in comparison to consumers of palm oil.⁴⁰ WHO recommends that iTFA replacement products should be low in SFA (less than 10% of total energy intake) and high in PUFA (poly-unsaturated fatty acids) such as omega-3 and omega-6. It recommends using palm oil only when the final product requires an oil solid at room temperature to give body to the product, stating, "Hard stocks such as animal fats, tropical oils and its fractions, and fully hydrogenated oils may be more affordable, but are not recommended as full PHO replacement because they have high SFA content; for example, palm oil can be used as a baking shortening but is around 50% SFA."⁹ A blend of palm and groundnut oil (recommended by WHO as liquid oil blended with 1% or 2% fully hydrogenated oil) may be of interest to edible fat and oil producers to improve the fatty acid ratios, produce a trans-fat free option for food manufacturers, offer a product with different stability for baked goods rather than only using groundnut oil, and utilize multiple local resources.

Local sourcing of a resource such as groundnut oil could offer benefits to SMEs such as lower costs, greater speed to market by purchasing locally, and creating partnerships to support other regional SMEs.

3.2.2 Pakistan

The interesterification method (chemical or enzymatic) and dry fractionation and blending method were identified as the optimal iTFA replacement options for Pakistan. Interesterification rearranges the distribution of fatty acids within the triglyceride structure, thus modifying the melting and the crystallization behaviors and mimicking the favorable properties of trans fats. These blends can be created with palm oil or palm oil blends. Palm oil blends are also a potential iTFA replacement for vanaspati ghee. Both options can be implemented at a relatively low cost due to the availability of imported palm oil, but the interesterification method requires knowledge and implementation of complex technological processes.¹³

Figure 2: Interesterification method, from Enzymic Interesterification of Fats: Factors Influencing the Choice of Support for Immobilized Lipase¹⁵



3.3 Palm Oil

While palm oil is widely available both in Nigeria and Pakistan and hence most likely to be used for iTFA replacement options at least to some extent, it needs to be emphasized that replacement of iTFA with palm oil should be minimized to maximize health benefit from TFA elimination.

3.4 SMEs and Business-to-Business Support

GAIN/SBN pilot project focused on supporting SMEs in eliminating iTFA by understanding the challenges they face, by identifying relevant iTFA replacement solutions and by leveraging the expertise of large companies (members of the International Food and Beverage Alliance) that have reduced/ eliminated iTFA from their food value chain. SMEs are of vital importance in low and middle income countries, where they employ large proportions of the labor force.⁵ In Nigeria, survey data show that 99.6% of businesses have fewer than 10 workers, thus qualifying as SMEs.¹⁶ In Pakistan, over 90% of 3.2 million registered business enterprises identify as SMEs.¹⁷ When considering the food system in low and middle income countries, SMEs and smallholder farmers comprise the majority of the food system.¹⁸ When considering public-or private-sector efforts to increase the accessibility and availability of nutritious foods in markets such as Nigeria and Pakistan, SMEs should be a primary focus.²⁰

When considering the ability of SMEs in low and middle income countries to eliminate iTFA, it is critical to understand the main constraints they face in order to provide them with tailored support. These constraints include difficulty accessing markets, limited access to finance, and low levels of human capital.¹⁹ While there is some worldwide funding and assistance to SMEs, limited evidence or reports exist regarding the impact of this support. For example, the World Bank gave nearly \$10 billion to SME projects during 2006-2012 in low and middle income countries.⁵ In addition, there is increased need for innovative support approaches to meet the needs of SMEs in nutritious value food chains, as they often do not qualify for traditional forms of financing.¹⁸ Several methods exist to provide support to SMEs including the delivery of training and technical assistance.⁵ Larger and more established companies can provide their experience and knowledge of iTFA elimination in the food value chain while considering the specific constraints faced by SMEs. Technical assistance is defined as non-financial assistance provided in the form of sharing information and instruction, skills training, working knowledge, and consulting data.²¹

3.5 iTFA labelling

Several SMEs already manufacture products meeting WHO guidelines for iTFA-free products, and the majority of stakeholders interviewed identified the desire to be known as a reliable company that consumers can trust to provide them with healthy products. Use of claims promoting the trans-fat free status of these products varies. A Nigerian SME interviewed produces locally sourced peanut butter. The products vary in trans fat content from 1.5-1.6 g/100g, and the stakeholder is passionate about being a “healthy” company and promoting an inexpensive and nutritious product to Nigerians. While the product website makes health claims such as “protein rich”, “low in sugar & salt”, and “no cholesterol”, they do not promote the trans-fat free claim for their products. A Pakistani SME producing edible fats and oils sells a trans-fat free vanaspati ghee. The product website states ghee as: “high quality” and “transfat free with a transfat content of less than 1.5% making [it] the healthiest brand of vanaspati available in Pakistan today”. The product label also makes note of the trans fat free product status. Of particular interest for food manufactured in Nigeria is use of the front of pack Heart Check Food Labeling program from the Nigerian Heart Foundation (NHF). Requirements to obtain this Heart Check logo include a company application for product endorsement, analysis by two laboratories approved by NHF, examination of laboratory results by a team of dietitians and scientists, and assessment of packaging for nutritional accuracy.³⁴ A representative from the NHF executive board identified that Nigerian oil producers desire this label, and that the next step for this certification is for products to have a trans-fat free status. Approval from a local public health authority for iTFA-free products represents a valuable way to promote and encourage public awareness.

3.6 Consumer focus

Only one stakeholder interviewed described implementing any marketing campaigns, changes to product packaging or labels, or promotional education to consumers regarding the dangers of iTFAs. This includes stakeholders working for SMEs already manufacturing products meeting WHO iTFA guidelines. The stakeholder who had educated consumers used informal, word of mouth education rather than formal advertising or changes to product label. Creating awareness of the adverse health impacts of TFA among the public is one of the primary pillars of the WHO's action areas to replace iTFA. This awareness is crucial to advance policy and industry change. Stakeholders interviewed repeatedly highlighted the need for product reformulations to still fit customer demographics and needs.

Several stakeholders identified that their companies had previously marketed their products for other health benefits such as reduced sodium levels for cardiovascular diseases, but they had not been concerned with the adverse health effects of iTFA. This highlights the need for country-wide public health campaigns. Mass media educational campaigns have been shown to increase knowledge and awareness of various health topics, and is considered to be an integral part of a policy advocacy change.⁷ These campaigns can include outreach with use of advertising in television, radio, print, or billboard; in-store media education; or leaflets delivered to consumers.³¹ Such interventions have previously shown successful in Pakistan. Newspaper articles illustrated by Heartfile, an organization dedicated to improving health systems and access to health coverage in Pakistan, were run in a large city for 130 consecutive weeks with messages targeting improved diet and health. When city residents were later surveyed via telephone, 87% of respondents stated that the articles significantly improved their knowledge about diet, and 40% reported making dietary changes as a result of the articles. Over 600,000 individuals were reached for a cost of USD \$169 per article.³² In Nigeria, the Environmental Rights Action/Friends of the Earth Nigeria partnered with the Network for Health Equity and Development on 3 March 2020, to host a training session for journalists to effectively report trans fats concerns in Nigeria. Training stakeholders identified the importance of partnering with media to create awareness and gauge public perception of the issues around trans fat consumption.³³ One Nigerian workshop stated that for example radio advertisement would have considerable reach, and that consumers could ask their local vendors what efforts they are making to reduce or eliminate iTFA. Many local vendors would have the health of their customers in mind, and act in their interest to reduce iTFA if they were aware of the adverse effects. Governments or civil society organizations wishing to adopt a trans fat public service announcement can find a sample media action plan shared on the WHO's REPLACE trans fat website.

3.7 Cost impact of iTFA elimination

In countries lacking standardized regulations for iTFA, companies think that products made without iTFA will be less accepted by consumers due to increased cost and perceived loss of preferred product characteristics.

One representative from an edible fats and oil company selling both to businesses and to consumers identified that iTFA-free products pass an extra cost to the purchaser. When estimating the costs to the food industry in removing trans fat from the American food supply, the FDA projected the initial removal costs at \$8 billion USD.²⁵ While the cost is likely to differ in other countries, this representative shared concerns about the company's capacity to absorb potential extra cost for product reformulation, and indicated that passing the extra cost to the consumer might not be feasible. 61% of Nigerians live in absolute poverty, and almost 100 million citizens live on less than \$1 a day.²⁶

SME stakeholders who have taken steps to eliminate the presence of iTFA in their products identified these specific cost increases:

- A Pakistani oil mill representative identified that the cost of a trans-fat free product for his company was an increase of approximately 5-6 PKR/kg of oil, or \$45.60 USD/ton for an oil formulation change using the chemical interesterification process. The average per capita consumption of edible oil in Pakistan is 23 kg/year.⁸ These extra costs were attributed to labor and equipment investment, operating costs, and yield loss. The greatest cost to the company would be the initial investment in equipment and engineering.
- A representative from a Nigerian groundnut oil company identified that his company still needs to purchase an oil refinery machine to provide purer groundnut oil to his customers. This machine would consume more electricity, require more space, and use extra labor. This would pass an extra cost on to his customers, who are typically individual consumers and not large businesses, making the absorption of price increases more challenging.
- After attending the workshop and learning about the adverse health effects of iTFA, a Nigerian snack food company reduced the number of times it re-fried its oil to produce a batch of product. Previously, a batch of product would be made with oil re-used 15 times, while this oil is now being re-used 10 times. This 33% increase in oil consumption represents a significant increase in supply costs and would increase drastically if the batch is re-used 3 times as recommended by IFBA expert. As of now, the stakeholder is opting to not pass this cost onto the consumer, but instead is reducing his profit margin.
- A representative from a Nigerian commercial bakery stated that the price of cookies increases from 1,500 NGN per kilogram to 2,500 NGN per kilogram when using trans-fat free oils. This cost is due to the higher cost of these oils. In this case, the bakery is using this price change as an opportunity to educate consumers and explain that they are now purchasing a healthier and safer product.

Introduction of trans-fat free products has had various price impacts in different countries. For example in Denmark the iTFA ban had no noticeable impact on the price of foods.²⁷ Enactment of legislation prohibiting fats and oils containing iTFA may equalize the cost for consumers across companies, but until this is enacted in Nigeria and Pakistan, concerns around food prices and consumer demand remain for SMEs in these countries.

3.8 Quality concerns for iTFA replacement

Information provided by a Pakistani food products bakery identified product quality and texture concerns from replacing iTFA in the company's products. Deep frying of vegetable oils at temperatures higher than 200°C leads to isomerization of the acids and higher yields of TFA in the finished product.² The stakeholder identified that by reducing the frying temperature, the product would have a longer cooking time, absorb more oil (adversely affecting product palatability), and have a shorter shelf life. PHO offer desirable characteristics to baked goods such as crispiness, appealing crumb structure, and tastiness. Another Nigerian commercial bakery stakeholder stated that the texture of her products has changed since using oils such as olive or sesame instead of iTFA-containing shortenings. Such comments identify a need for further technical assistance directed at solving these quality issues. Many commercial bakeries struggled with finding trans-fat free solutions to achieve desired functionality after the iTFA ban in the United States. However, one United States popcorn company was able to improve consumer taste scores of their microwave popcorn products while decreasing product trans and saturated fat contents.²⁸

When considering consumer preferences for vanaspati ghee, stakeholders stated that consumers dislike the texture of iTFA-free ghees. The texture of ghee is dependent on multiple factors, including fat source, preparation method, amount of free fatty acids, and the temperature of clarification. The preferred texture and important factor in selecting a ghee product is a high grainy texture, yet iTFA-free ghees lack this grain.²⁹ In Pakistan, several edible fat and oil manufacturers already offer virtually iTFA free or blended low trans fat vanaspati ghees.⁸ When Denmark enacted a nationwide ban on iTFAs in 2003, margarine producers experienced a similar quality issue. Industrial customers disliked the mouth feel and melting point of the new product, but within several years this issue was resolved with investment in further research and development, particularly with the development of enzymatic interestification.³⁰

3.9 Impact of the project

The workshops contributed to increased knowledge around iTFA (impact and replacement solutions) among their participants. The workshop participants interviewed indicated having varied knowledge levels going into the workshop based on their professional experience and educational backgrounds. Participants from the edible fat and oil industry had more knowledge of iTFA than others interviewed. All participants interviewed (a total of five representatives from food manufacturing and three edible fat and oil manufacturers) stated that they were now familiar with iTFA and health effects of iTFA dietary consumption and had also shared their learnings with coworkers. Four additional workshop attendees interviewed had previous knowledge of iTFA due to their work in public health or as employees of multinational food companies. Another common response from stakeholders was that workshop attendance informed them about future food initiatives to support the consumer health. Other beneficial outcomes from the workshop are:

- After attending the workshop, a Nigerian snack food producer located in Bukuru employing 10 full time staff, 5 part time staff, and 8 seasonal employees - who had no previous knowledge of iTFA - has reduced the number of times oil is re-fried at 180°C to make a product. Previously, a batch of oil would be re-used 15 times, but is now being re-used 10 times. He would also like to replace the margarine used in his company's syrups to a trans-fat free product. While this stakeholder is opting to reduce the lifespan of oil batches, it indicates the need for further education for fried food manufacturers. Cis to trans isomerization of fats occurs at 150°C and heating oil at 200°C for only 20 minutes increases TFA levels by over 350%.²² An IFBA representative at the workshops instructed participants to re-use batches of oil no more than 3 times.
- One stakeholder from a Pakistani commercial bakery employing 20 staff in Lahore stated that his company has put more research and development efforts into replacing iTFA in their products after attending the workshop.
- An edible fat and oil supplier representative headquartered in Islamabad with 239 employees stated his company was putting more research and development efforts into products other than vanaspati ghee following the workshop, whereas before vanaspati ghee was the only iTFA-free focus.
- A Nigerian stakeholder who owns a commercial bakery located in Kano and employing 12 staff stated attending the workshop has eliminated use of margarines/shortenings containing TFAs and has taken the time to create awareness about the adverse health effects of TFAs for the majority of her customers.

Connecting and sharing the struggles and experiences of food manufacturers who have successfully reduced or eliminated iTFA content in their products with SMEs in countries such as Pakistan and Nigeria are important and will help provide necessary technical assistance. Providing technical assistance specific to the type of food manufacturing may also be useful for SMEs to see examples of product reformulation relating most to their industry.

3.10 Limitations of the project

One major obstacle to conducting this assessment was restrictions placed on travel and businesses due to the outbreak of COVID-19. Stakeholders in both countries were sometimes unavailable due to power outages or poor internet connection in their neighborhood. Reaching all stakeholders this way was challenging, and in-person interviews would possibly be more effective.

Another COVID-19 related project gap was reduced supply-chain availability due to lockdowns. Stakeholders in Pakistan identified a reduction in the availability of raw materials due to transportation delays resulting from companies or areas having to shut down. A Nigerian stakeholder identified that the cost of his raw materials has significantly increased following a government-mandated lockdown. The Nigerian borders are closed, and product transportation options have decreased. The stakeholder identified the following cost increase at the market at which his company purchases supplies: a 14% increase in the cost of flour, a 32% increase in the cost of oil, and a 66% increase in the cost of sugar. These costs or other stresses to businesses related to COVID-19 may delay company efforts to reduce trans-fats as priorities are refocused on other areas of operations and could also be a reason for the low response rate from stakeholders. However, COVID-19 has highlighted the increased vulnerability of populations suffering from poor health and it is therefore critical to keep working on global elimination of iTFA by 2023.

IFBA committed to share best practices and guide SMEs in the iTFA replacement process. The technical assistance provided by IFBA members was focused on education at the workshops, with potential follow-up technical assistance after the events still under discussion. Follow-up support is often overlooked in professional training. This support includes providing a set of strategies after a learning event to strengthen the presented concept. It is most successful when planned prior to the learning event.⁴¹

4. Recommendations

4.1 Opportunities for Sustainable Support to Local Companies

Opportunities for duplication and sustainable support to other companies for B2B iTFA replacement should focus on more targeted and specific education provided remotely. Trainings could be recorded by experts and compiled into sessions and shared on a website such as Dropbox where the stakeholder can access the sessions with a private link, thus avoiding the need for travel and the associated costs and current health risks. As many stakeholders stated that they struggle to access reliable internet, the recordings could be loaded onto a flash drive and shipped to the stakeholder. An incentive for completing the training modules such as certification or membership to SBN could be provided. This technical assistance should be organized into modules specific to type of food producer, and also have accessible modules with country specific information such as regulations, available natural resources, partner organizations, current consumption and sources of foods containing iTFA, market research, and other information already gathered by in-country consultants or agencies.

Once SMEs have an opportunity to watch the modules, they should be provided with contact information for a pre-appointed technical assistance representative or IFBA member. This representative can answer specific questions or concerns and can offer specific methods for iTFA elimination from their company. Another option would be to host a live webinar with the same educational modules to promote Q&A and discussion between stakeholders and experts. This would more similarly replicate the format of a workshop, and also encourage networking. It should be noted that not all SMEs wanting to learn more or participate in discussions about iTFA elimination would be ready to introduce change to their organization. The change readiness of a SME should be assessed by the local SBN office and open communication established to determine reasons why a company is not yet ready to make changes (see Annexure III). If a common pattern is noted, the technical assistance can be adapted to address the reasoning for change resistance.

In addition, networking opportunities should be created and promoted for in-country businesses to connect. Virtual meet and greets could be hosted regularly by SBN SME representatives to discuss strategy, and share the challenges they are facing around iTFA elimination. In Nigeria, these events could also be joined by local journalists trained by NAFDAC to report about iTFA removal. Utilizing journalists and local stakeholders can raise consumer awareness and promote further local buy-in.

The following organizations expressed interest in potentially providing B2B support to continue local efforts for iTFA elimination:

- Novozyme: this company produces a lipase for chemical enzymatic to yield trans-fat free shortenings. A representative stated that the technology is used for companies producing a minimum output of 40-50 tons/day and requires a primary investment of \$0.2-0.5 million euros. They would be agreeable to further discussions about providing potential market education and knowledge dispersing.

Nigeria

- **Trans Fat Free Nigeria:** this public health campaign builds media engagement across multiple platforms to create nationwide awareness of the health dangers of trans fats. Their engagement platforms include national TV/radio stations, radio, newspapers, and social media. They would be agreeable to promoting iTFA elimination efforts of local businesses and highlight the work of GAIN/SBN.
- **Nigerian Heart Foundation:** the Nigerian Heart Foundation is a non-profit NGO founded to promote heart health, scientific research, healthy lifestyles, and advocacy on heart issues for Nigerians. Prior to the outbreak of COVID-19, a national workshop was planned for May 2020 with a focus on promotion of Nigerian food and beverage cardiovascular health initiatives, including iTFA. The foundation director indicated a willingness to support future iTFA elimination efforts and TA support in Nigeria.
- **Biovensis Nigeria:** this nutraceutical and nutrition advocacy company attended the Lagos workshop. The stakeholder present at the workshop was identified to be a qualified consultant to assist with local technical assistance efforts, and has a strong food science background, awareness of local regulations and industries, and past experience conducting fortification projects in Nigeria.
- **Nigeria Consumer Advocacy for Food Safety and Nutrition Initiative (CAFSANI):** the purpose of this organization is to inform, protect, educate, and promote consumer interests in the area of food safety and nutrition for Nigerians. The executive director currently offers virtual assistance on a variety of food safety and regulatory topics on the Nourishing Africa ask an expert platform and offers food industry consulting work with Glytab Consulting. CAFSANI also offers virtual workshops on food safety topics and has worked extensively with the Nigerian Heart Foundation. They would also be willing to support local iTFA elimination efforts and support to SMEs.

Pakistan

- **PepsiCo Pakistan:** this multinational food, snack, and beverage corporation supports WHO recommendations to limit iTFA to less than 2 grams of iTFA per 100 grams of total fats and oils in the product. These efforts have already been made in Pakistan, and the head of scientific and regulatory affairs at PepsiCo Pakistan committed to provide technical assistance and labeling support to local snack food producers.

Sectoral technical assistance could be delivered as follows:

- **Edible Fats and Oils:** information regarding availability of laboratory testing, options for trans fat free oil blends, temperature and iTFA formation, mechanical purification of oils, texture of iTFA-free ghees.
- **Food Manufacturing:** information regarding oil heating temperatures and TFA formation, amount of times oil can be reused for frying, impact to product taste/texture, shelf life storage concerns.

It is important to provide an adequate balance of follow-up support and strategies to workshop participants so that they can develop solutions to fit their needs. Options for follow-up technical assistance discussed with IFBA representatives included technical assistance needs specific to the company's signatories of an iTFA removal commitment form. Technical assistance provided to companies in the future will need to be adjusted to the regulatory environment as both countries are exploring regulating TFA content in foods.

4.2 Duplicating the project in other countries

There is no one size fits all solution when considering iTFA elimination. However, this assessment provides insight into opportunities and challenges for sustainable support to national companies in replacing iTFA in other countries. Prior to offering technical assistance for future countries or regions, the first step in working to eliminate iTFA consumption in a country is to understand the dietary sources and assistance needs, as recommended by the WHO "Review" module to eliminate TFA use. Use of an in-country consultant by GAIN/SBN is recommended to determine local consumption and possibilities for iTFA replacement in the food value chain. An in-country consultant can also offer insights into typical dietary patterns in countries where nationwide dietary survey does not exist and where the proportion of food obtained from the informal sector makes tracking progress difficult. The food landscape may also be specific to the region; for example, vanaspati ghee is a major source of iTFA for Pakistanis but not for Nigerians.

The in-country consultant can also provide an assessment of the local regulations and types of companies manufacturing products containing iTFA. Partnering with local SMEs responsible for iTFA production and providing them with technical assistance and resources to eliminate iTFA is also recommended. Studies examining the success of various TFA elimination strategies have found reformulation of food products to be useful in reducing dietary intake of TFA over time, although legislation has been shown to be the most useful strategy.⁴² However, legislation may not always be a current reality for some countries, and several additional steps should instead be considered for eliminating iTFA.

Partnering with other NGOs and local/national organizations to work towards trans-fat elimination should also be considered. Utilizing multiple partnerships will give an increased national presence to the iTFA elimination movement. For example, Global Health Advocacy Incubator in collaboration with local partners has been supporting initiatives for trans fat elimination in Nigeria. It is essential to create public interest and awareness regarding iTFA, and working with other organizations can put pressure on changes to regulation, creating awareness, and understanding business needs to make changes to food supply systems.

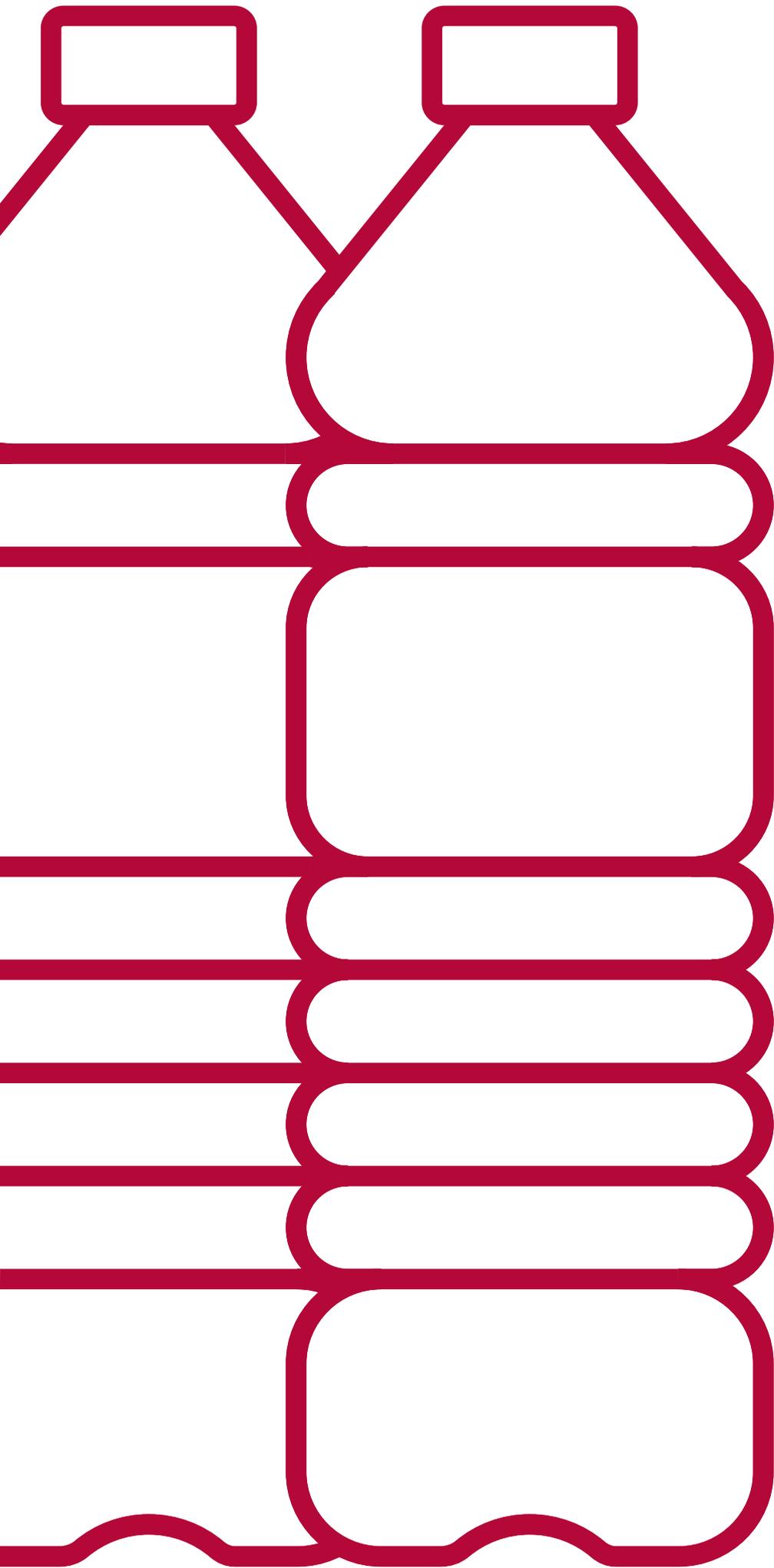
4.3 Next steps

In addition to the organization of workshops and provision of information included in this project, Nigerian and Pakistani SMEs identified several recurring ideas for future activities to support iTFA elimination by local companies in low and middle income countries:

- One Nigerian peanut butter company of 35 employees had identified creating networking relationships at past tradeshows and receiving technical assistance specific to her product as beneficial.
- A Pakistani SME described noted reaching out to contacts from a previous job at a transnational consumer goods company for support and methods to remove iTFA from products.
- A Nigerian stakeholder from a palm oil producer in Aba employing 120 workers was familiar with trans fats from attending a seminar organized by Nestle and hosted by another palm oil producer in 2016; another Nigerian stakeholder was familiar with trans fats from attending a workshop hosted several years ago.
- A Nigerian SME stakeholder identified that many small business owners discuss the optimal brand or product type to purchase with the shopkeeper at the open market retail outlet. Only 5% of shopping in Nigeria is completed at a formal retail operation²³, and so the relationship of the business owner and shop keeper is important to consider in networking.

The importance of networking to SMEs in low and middle income countries lies in building relationships with established firms to overcome size obstacles in a global market. Networking also allows SMEs to be exposed to international markets by providing institutional, business, and internationalization knowledge.²⁴ While creating networking opportunities with multinational companies at events such as the GAIN/SBN workshops are useful, it appears that opportunities to establish relationships with local companies are also beneficial.

- The stakeholder from a groundnut butter company called for more time dedicated to networking at future GAIN/SBN events. Promoting opportunities for local B2B networking would be valuable for SMEs to share knowledge, products, experience, and technical assistance specific to their country.
- A Nigerian bakery owner stated that she would like more frequent educational opportunities and meetings hosted by SBN so she can learn how to continue to improve and provide healthy products to her customers.
- A stakeholder from a Lagos, Nigeria groundnut oil company employing 11 people shared that networking opportunities would benefit his company because he can talk with other people who know more about a topic and have already applied that knowledge in a local setting.
- One of the private sector interviewees shared information about a webinar provided by a Danish enzymatic interesterification company on technical assistance targeted for Asia Pacific edible fat and oil producers. This company is not associated with GAIN/SBN and did not provide B2B support at the national workshops, but rather reached the stakeholder through email subscription. This free event could benefit other stakeholders and could be shared and viewed by others on a channel such as LinkedIn.
- Another potential example would be an edible food and oil producer who attended the workshop creating a connection with a food products bakery to provide a source of iTFA-free oils for use in their products. These examples highlight a need for further encouragement and networking opportunities for SMEs.



Annexure I - Companies Interviewed

1. Nutzy Peanut Butter (Arjena Food Ltd.) – Nigeria
2. Superserv Global Enterprise – Nigeria
3. Distrifoods Nigeria - Nigeria
4. Kitchen Vegetable Oil – Nigeria
5. Ahwas Bespoke Events – Nigeria
6. Presco Plc - Nigeria
7. Punjab Oil Mills – Pakistan
8. Chaudhary Food Products – Pakistan

Annexure II - Interview Questions For Stakeholders

Knowledge of iTFA and potential replacement solutions

- How has your understanding and view of trans fat changed since participating in the workshop? Have you shared this information with your company?
- Were you aware of the health impacts of iTFA prior to the workshop?
- Were you aware of iTFA alternatives prior to the workshop?

Replacing iTFA in the food value chain

- Since the workshop, what steps has your company taken to reduce the level of transfat in foods (testing, working with suppliers, project teams, education)?
- Before the workshop had your company already taken any steps in reducing trans fats level in your products?
- What F&O replacement solutions are you considering using? What are the cost and technical implications of these replacements? How do these F&O types and volumes compare with pre-iTFA replacement?
- Have you had to redesign plants or change processing methods? If so, what was the cost and how did you fund this/these investment(s)?
- How long did the change process take? What was the most difficult step in establishing these changes? Did any of your employees receive technical training to implement the change?
- Have SOPs changed?
- Did you receive support from sources other than GAIN/SBN/WHO in removing iTFA from your products?

Supply of fats and oils

- Do you know the iTFA level in the oils and fats you purchase/sell?
- Have you taken any steps to access iTFA free fats and oils?
- What resources have been most helpful to you during this time (i.e. regulatory guidelines, information from your fats and oil supplier, information from SBN)?
- (For food companies): Have you reached out to any F&O suppliers for assistance with finding a low iTFA formulation? If not, do you plan on doing this? If so, what were the outcomes?

Marketing/demand creation

- Have you been working on creating demand for products with reduced iTFA content? No iTFA content?

If so did you use the recommendations on marketing for a new product shared during the trans fat workshop you attended? Do you think you will be using these recommendations on marketing in the future?

- Have you or a representative from your company had additional conversations with any health or government officials?

General support

- How has the workshop impacted your business plans/goals?
- What opportunities has this workshop created?
- What challenges are you still facing in replacing iTFA?
- What assistance is still needed?
- What assistance can other companies deliver to support you in replacing iTFA?
- What would you recommend to do for more impactful workshops on iTFA replacement and follow up activities?

Annexure III - Change Readiness Assessment Questions

Value Alignment

- Does removing trans fat align with your business goals and reputation?
- What would be your primary reason for or against eliminating trans fat from your products?

Involvement

- What level of interest do your customers have in receiving a healthier product?
- Would you have the support of other stakeholders in your company to remove trans fat from your products?

People

- Does your staff have the knowledge to make this change?
- Does your staff have the resources to make this change?
- Do you have the ability to communicate potential product changes to your customers?

Time

- Do the people contributing to this project have the time to take on this extra work?
- Are there competing projects or priorities that may alter your ability to remove trans fats?

Skill

- Do you know where you can access resources about eliminating trans fat (i.e financial, technical assistance, marketing, regulatory, etc)?

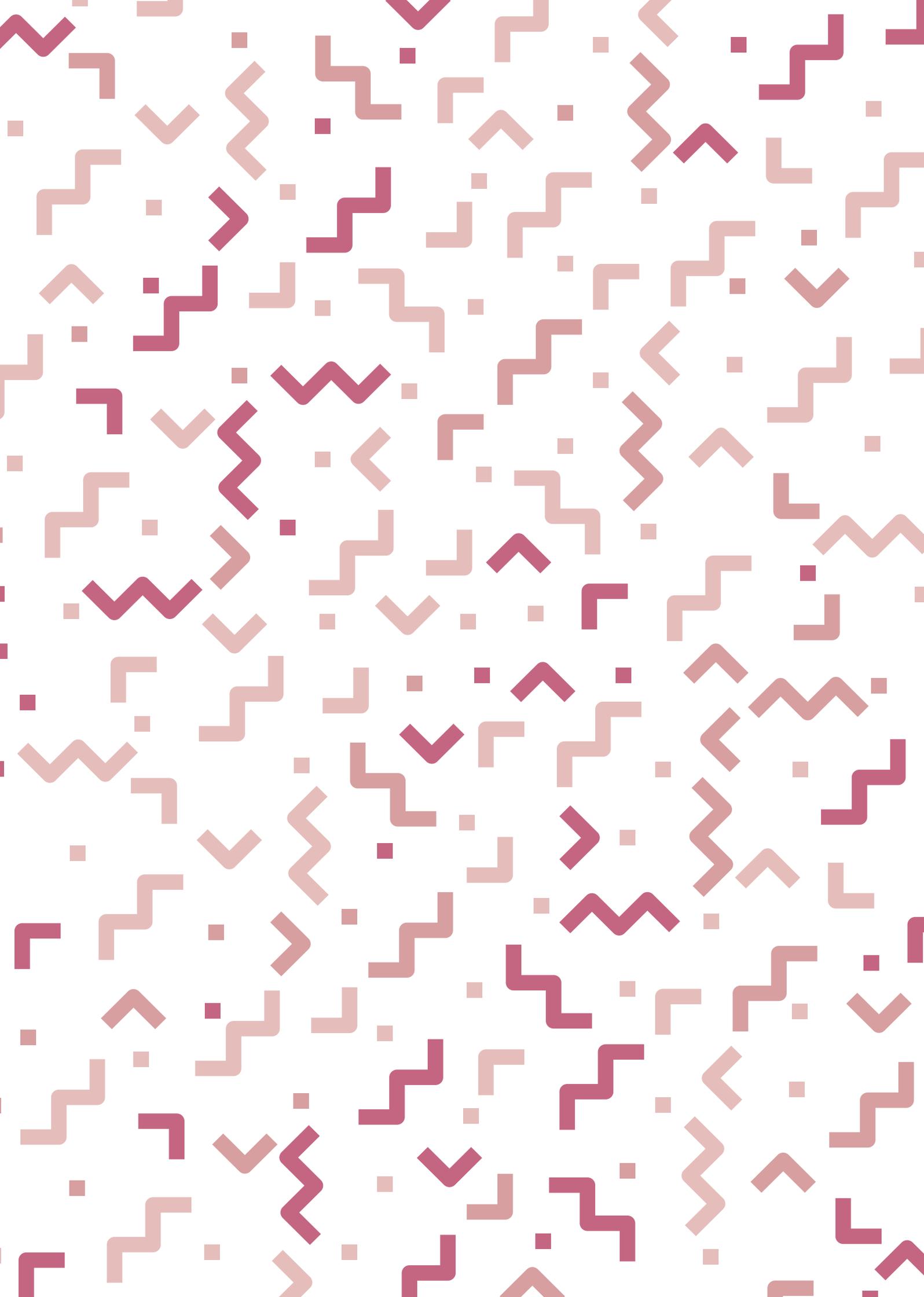
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