

Leveraging Agricultural Systems to Improve Nutrition Security

Investigation of 10 supply chains and entry points for nutrition



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The state of undernutrition in agricultural supply chains

Undernutrition – a lack of essential micronutrients in diets which impedes physical and cognitive development and productivity even when sufficient calories are consumed (hidden hunger) – is a significant global problem. Extensive research has shown severe levels of undernutrition in the main agricultural producing areas in Africa and Asia, yet levels of awareness remain low.

Agricultural supply chains are affected by undernutrition in several ways, which may lead to direct losses in productivity and resources from:

- > Reduced labour output and physical productivity due to illness, fatigue or other health related problems;
- > Reduced cognitive development and educational performance due to stunting or chronic malnutrition in early life;
- > Losses in household resources from increased health care costs.

In recent years global attention has focused increasingly on sustainability programs and certification standards for the production of cash and food crops. These structures usually address productivity, labor conditions, environmentally sustainable production methods and human rights with a view to contributing to economic development more broadly. The promotion of Good Agricultural Practices is at the core of such programs, but nutrition is rarely addressed.

Yet, the paybacks of nutrition investments are high as governments seek to reduce the burden of high health care expenditures. By investing in nutrition, industry can benefit from a) a more productive workforce, b) improved physical and mental development for future generations and c) more resilient and supportive communities. Consumers, farmers and workers have a shared interest in a global system which is sustainable and equitable; poor nutrition undermines both these goals.

Prioritizing 10 supply chains for nutrition interventions

GAIN's nutrition secure supply chain program will integrate nutrition interventions into production systems without competing with the current crop production. The program delivers improved nutritional status for farming families by working within a combination of existing complementary farmer training and community development programs to drive nutrition-sensitive sourcing strategies. Combining good agricultural practices and good nutritional practices, working with organized farmer groups as part of existing corporate sourcing programs, is impactful, cost-efficient and offers a powerful model which can be replicated across a range of supply chains.

For production regions where undernutrition is a major challenge (figure 2) and several agricultural commodities are produced in overlapping production areas, companies have an opportunity to combine their efforts and activities on nutrition (see map 1, 2 and 3).

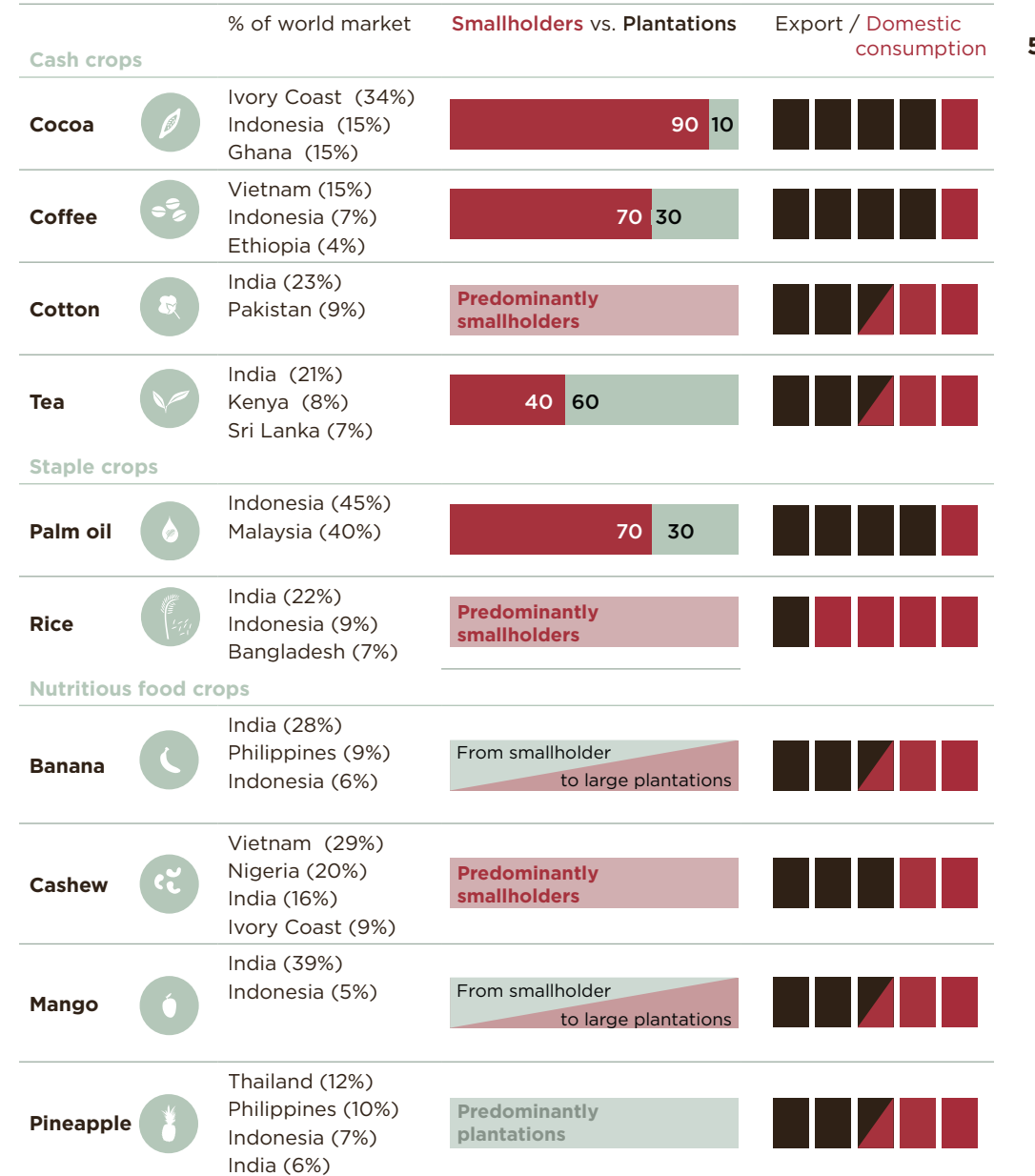
GAIN reviewed 21 of the largest global commodity supply chains 1, ultimately prioritizing 10 which are particularly well-suited for nutrition-sensitive interventions (figure 1).

Key elements of analysis were:

- 1 High level of undernutrition in the main producing countries 2
- 2 Structure of the supply chain (multinational sourcing, consolidated production)
- 3 Level of export vs level of domestic consumption (prioritizing domestic consumption of nutritious foods and export of cash crops to leverage global consumerism)
- 4 Strength and organization of ongoing sustainability initiatives (to be leveraged)

Within these 10 prioritized supply chains, the nutrition-sensitive interventions could potentially reach over 400 million smallholder farmers.

Figure 1: Selected 10 supply chains particularly well-suited for nutrition interventions 3



Maps 1, 2 and 3 illustrate the overlap of undernutrition and commodity production of coffee, cocoa, cotton, tea, flowers, cashew, rice and palm oil in 11 countries in West Africa, Eastern Africa and South and Southeast Asia. In order to show the undernutrition burden in the selected countries, four relevant indicators were chosen: stunting, child mortality, anemia in children and anemia in women of reproductive age.

Anemia in children

(6-59 months)

Concentration of hemoglobin below what is normal for a person's age and gender.

The indicator shows the percentage of children with anemia.⁶



Child mortality

Death of infants and children under the age of five years. In 2014, the world average was 48 deaths per 1000 live births.⁵

31 countries reported at least 10 per cent of children under five died.



Anemia in women of reproductive age

(15-49 years)

Concentration of hemoglobin below what is normal for a person's age, gender.

The indicator shows the percentage of women with anemia.⁷



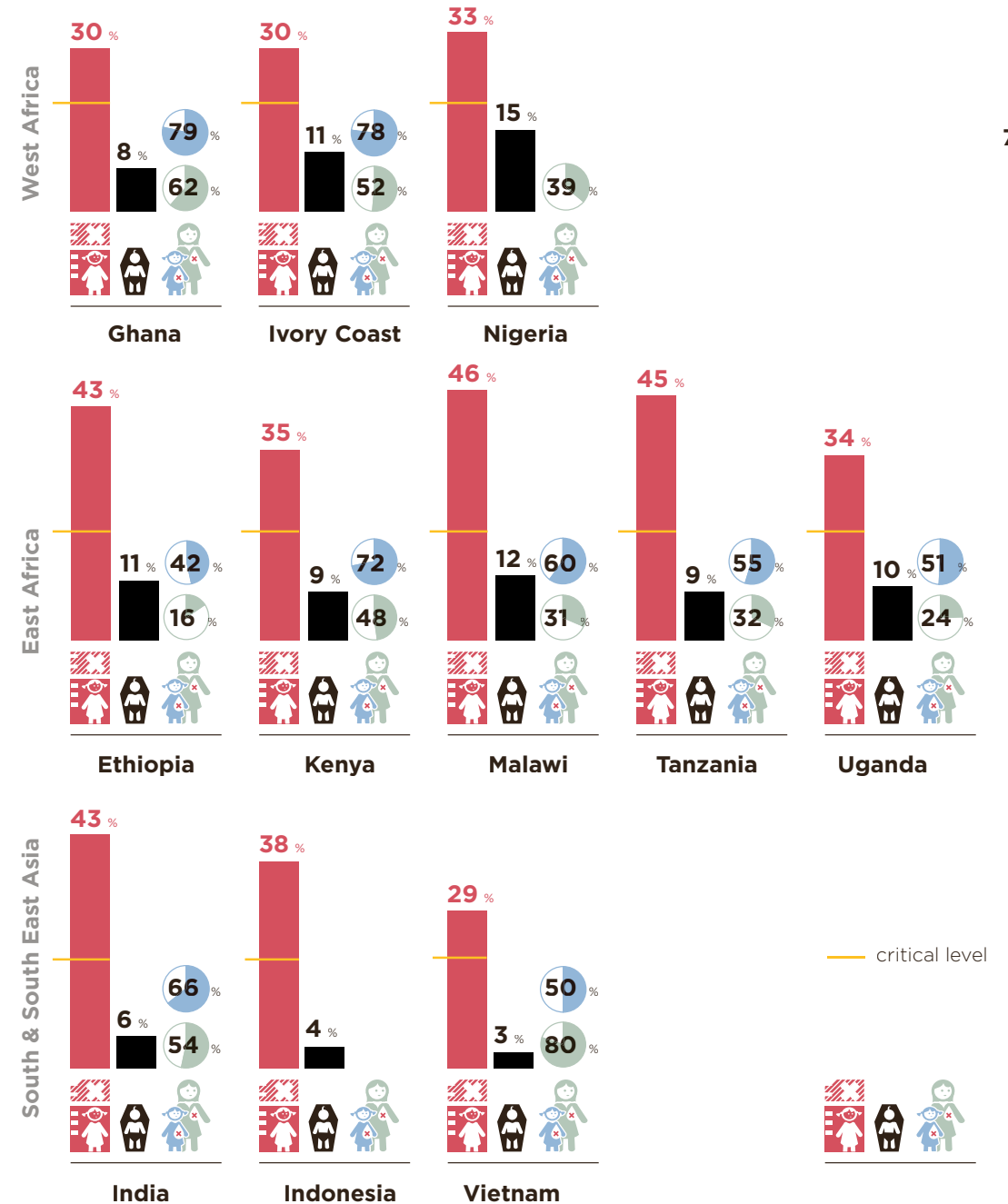
Stunting

Children are too short for their age as result of poor diet and exposure to disease.⁴

A score of 20% higher = level of undernutrition that needs interventions.



Figure 2: Burden of undernutrition in 11 countries according to 4 undernutrition indicators

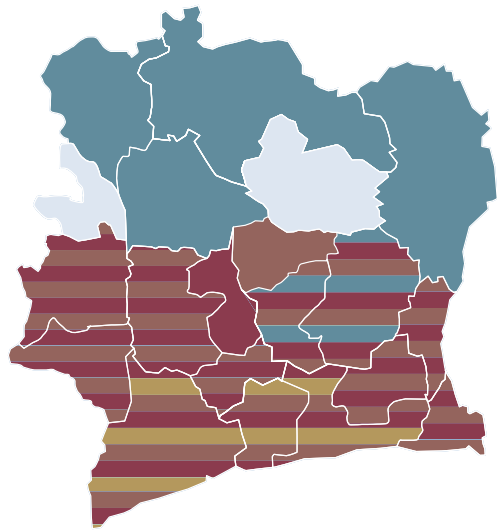


* average per country is calculated as average of all selected production regions

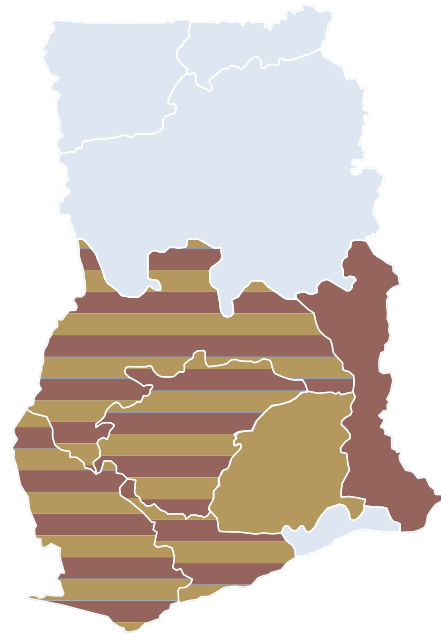
Map 1 West Africa

main production belts in regions with high undernutrition levels

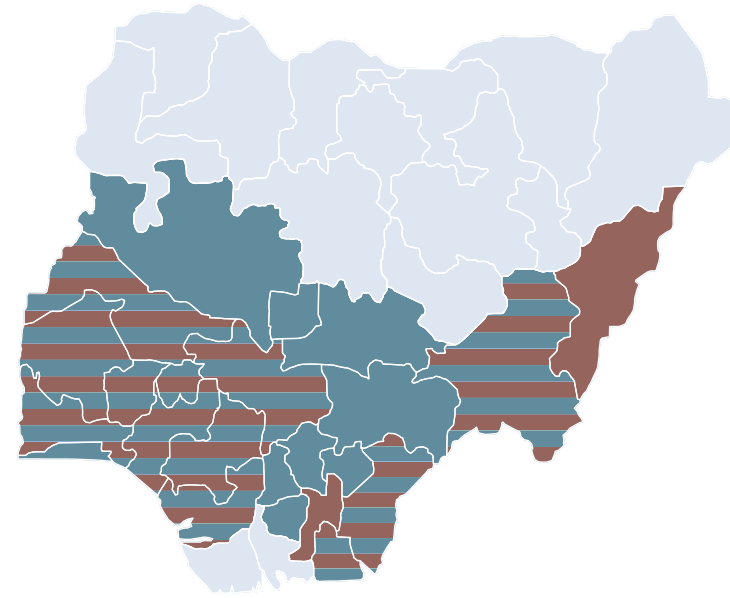
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Ivory Coast



Ghana



Nigeria

- Banana 
- Pineapple 
- Tea 
- Cashew 
- Flowers 
- Cotton 
- Mango 
- Coffee 
- Rice 
- Palmoil 
- Cocoa 

9

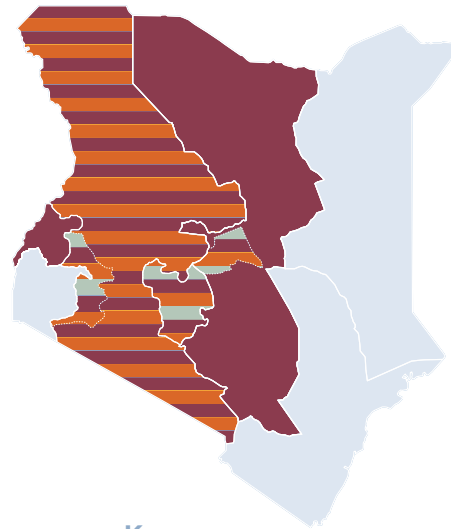
Map 2 Eastern Africa

main production belts in regions with high undernutrition levels

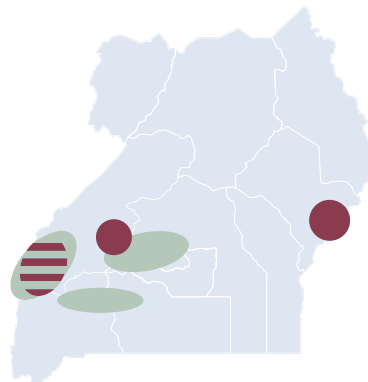
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Ethiopia

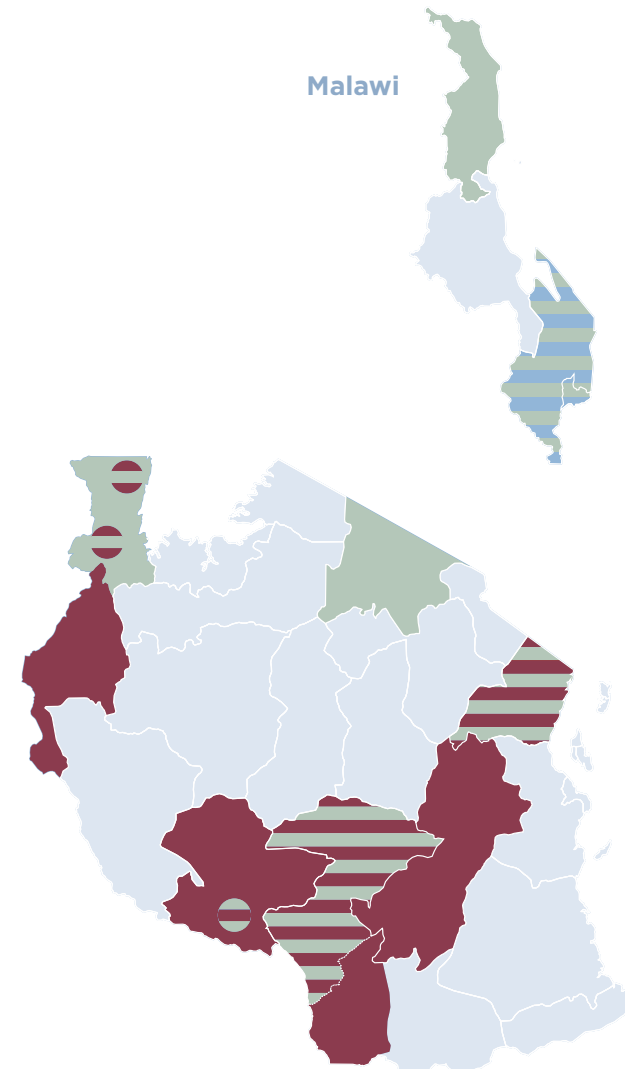


Kenya














Uganda

Malawi



Tanzania

- 11
- Banana 
 - Pineapple 
 - Tea 
 - Cashew 
 - Flowers 
 - Cotton 
 - Mango 
 - Coffee 
 - Rice 
 - Palmoil 
 - Cocoa 

Map 3 South & South East Asia

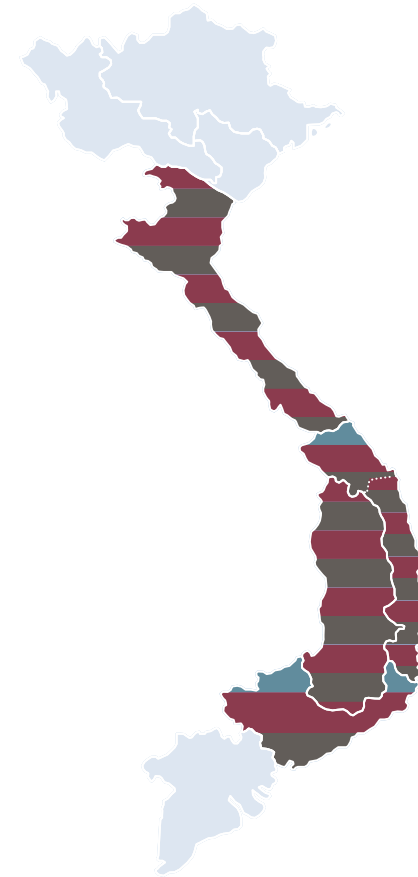
main production belts in regions with high undernutrition levels

12














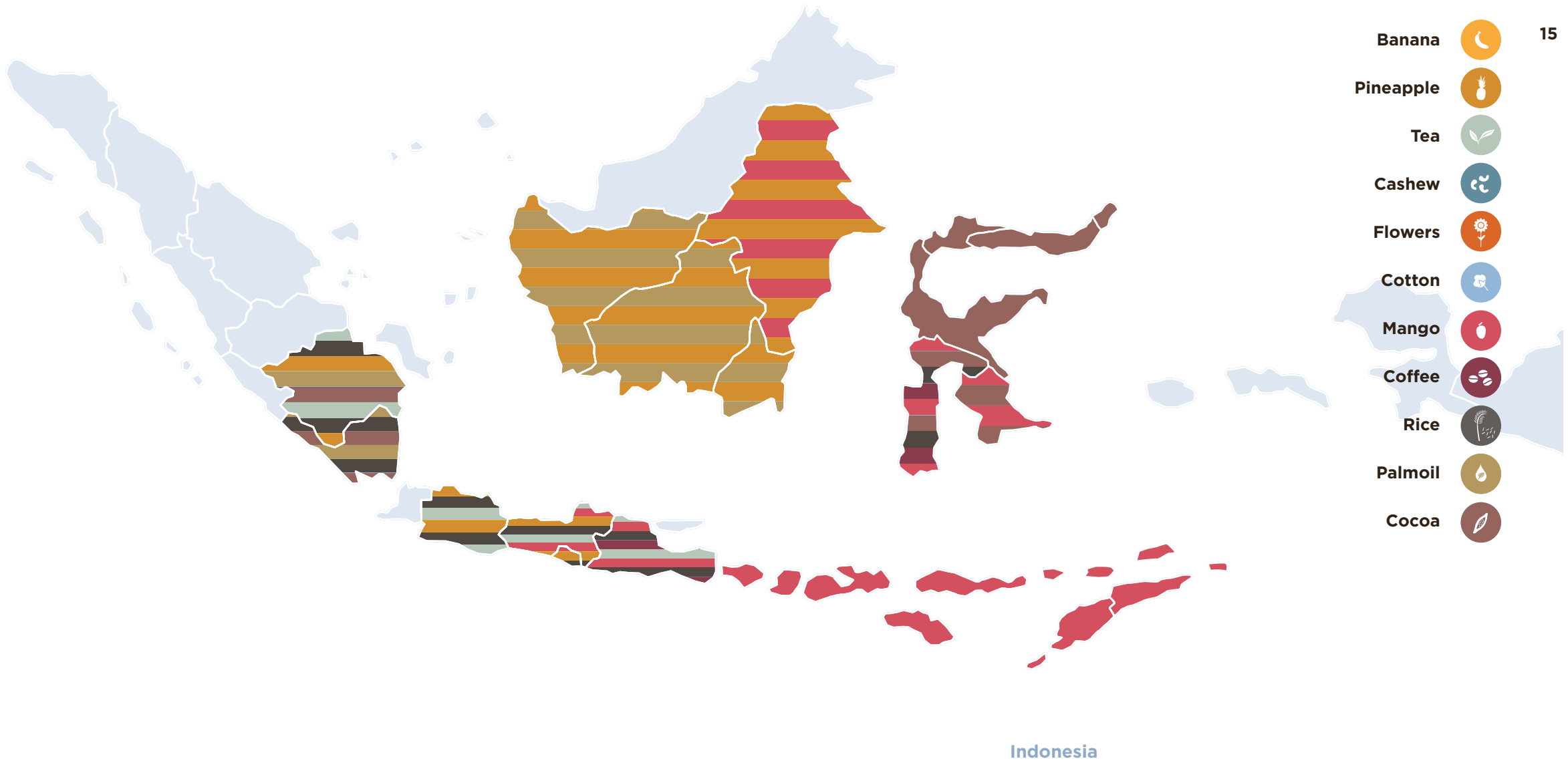
India

13



Vietnam

- Banana 
- Pineapple 
- Tea 
- Cashew 
- Flowers 
- Cotton 
- Mango 
- Coffee 
- Rice 
- Palmoil 
- Cocoa 



The sustainability of these supply chains is supported by the following standards systems and platforms, as shown in figure 3.

Figure 3: Current certification standards and major sector initiatives in selected value chains ⁴

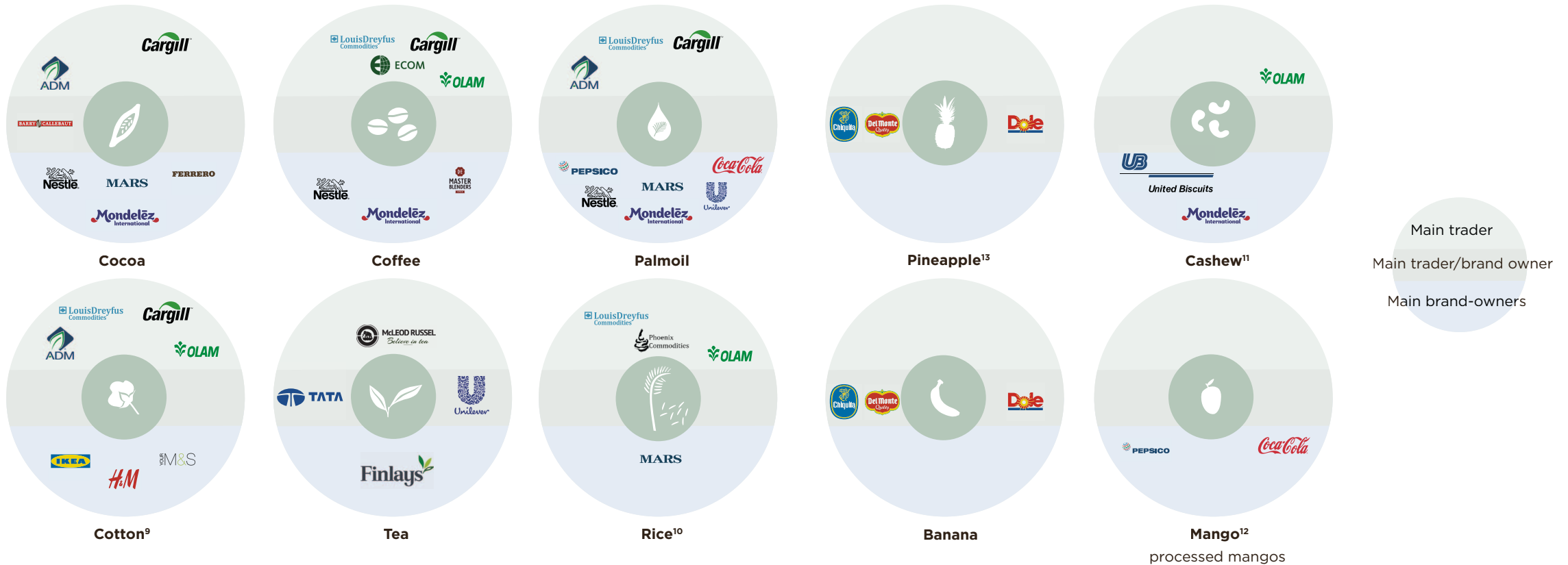
Certification						Major sector initiatives		
Cash crops	UTZ Certified	Rainforest Alliance	Fairtrade	Organic	Others	Global	Regional initiatives and partnership platforms	
 Cocoa	●	●	●	●	CEN TC 415	<i>ICCO</i> - International Cocoa Organization <i>ICI</i> - International Cocoa Initiative <i>WCF</i> - World Cocoa Foundation	IDH Cocoa Program	
 Coffee	●	●	●	●	4C - Common Code for the Coffee Community	<i>ICO</i> - International Coffee Organization <i>4C</i> Association	<i>ECF</i> - European Coffee Federation IDH Coffee Program	
 Cotton			●	●	Cotton: Better Cotton Initiative Code, Cotton made in Africa Code Garment: Fair Wear Foundation, Clean Clothier labour code, BSCI	<i>BCI</i> - Better Cotton Initiative <i>MADE BY</i>	Cotton Made in Africa IDH Cotton Program	
 Tea	●	●	●	●	Ethical Tea Partnership Code	<i>ETP</i> - Ethical Tea Partnership	IDH Tea Program	
Staple crops								
 Palm oil		●			Roundtable for Sustainable Palm Oil Code	<i>RSPO</i> - Roundtable on Sustainable Palm Oil	IDH Palm Oil Program	
 Rice		●	●	●		<i>SRP</i> - Sustainable Rice Platform	<i>CARD</i> - Coalition for Africa Rice Development	
Nutritious food crops								
 Banana		●	●	●	IMO Fair for Life	World Banana Forum	IDH Fruits & Vegetables Program / SIFAV	
 Cashew			●	●			<i>ACI</i> - African Cashew Initiative IDH Cashew Program	
 Mango		●	●	●	IMO Fair for Life		IDH Fruits & Vegetables Program / SIFAV	
 Pineapple		●	●	●	IMO Fair for Life		<i>UNDP</i> Pineapple Platform in Costa Rica IDH Fruits & Vegetables Program / SIFAV	

Figure 4: Main traders and brand-owners in selected 10 supply chains

Cash crops

Staple crops

Nutritious food crops



Key players in priority commodity chains

Many global traders and multinational food companies are involved in multiple commodities and are therefore well-placed to integrate nutrition programs across a range of different supply chains they operate, creating substantial economies of scale in program replication (figure 4). The information is based on public sources and is not complete due to a lack of transparency in commodity markets.

Flowers in East Africa

Though flower production is largely the business of developed countries and therefore does not make this list, the Kenyan flower industry is one of the largest in the world and has been criticized for poor labour and environmental standards. Kenya is the third largest exporter of cut flowers in the world. It employs 50-60,000 people directly and around 2 million people through related economic activities. The production areas around Lake Naivasha face particularly high undernutrition levels, with 36% of children stunted and only 23% of children consuming adequate amounts of iron.

Cut flowers are Ethiopia's third largest exported commodity by value and represent 13% of all exports after coffee and vegetables. The flower sector employs about 85,000 workers across more than 100 flower-growing farms. The production areas around Oromia, Amhara and the Southern corridor face particular high stunting levels, with more than 40% of children stunted and only 17% of the children consuming adequate amounts of iron.

The flower sector is organized in a Floriculture Sustainability Initiative and works together with 2 certification schemes (Fairtrade/Organic) and a Flower Label Program. This offers a good opportunity to introduce nutrition-sensitive interventions into the existing farming system.

Possible nutrition interventions in agricultural systems

It is possible to leverage current agricultural productivity systems to make them also act as vehicles to improve health and nutrition for farmers and their families. When designed well, good nutritional practices can be developed alongside existing good agricultural practices.

Figure 5 gives an overview of the different good nutritional practices, distinct by household, smallholder and plantation level. The first level of nutrition-sensitive interventions is on household/community level, where farming families can create or expand their own home gardens with nutrient rich vegetables and trees. Even with limited space these crops can be planted alongside the house, for example in plastic pots. Breeding animals like chicken, ducks or goats around the house is a good source for animal proteins like eggs, milk and meat. Because of time constraints, capacity and to promote efficiency it might be decided to expand interventions to a broader community level, including interventions like building pig farms or small fishponds.

Moving beyond the household, it is also possible to promote nutrition-sensitive interventions in the actual production systems, whether on a small field or a large plantation. Assuming that either the smallholder farmer or the plantation owner is entitled to make decisions on their fields, there are several possible interventions. Depending on the commodity and the related production system, interventions could be: intercropping of nutrient rich vegetables in between planting cycles, nutrient-rich vegetables and/or trees planted in buffer zones (for example in zones bordering the rainforest, along water streams and/or on border fences) and the structural intercropping of nutrient-rich trees for shadow, erosion control, or firewood.

For plantation owners additional nutrition interventions are possible, for example by distributing micronutrient supplements (e.g. iron tablets, vitamin A tablets) to their workers with nutrient deficiencies or by providing more nutritious canteen menus.

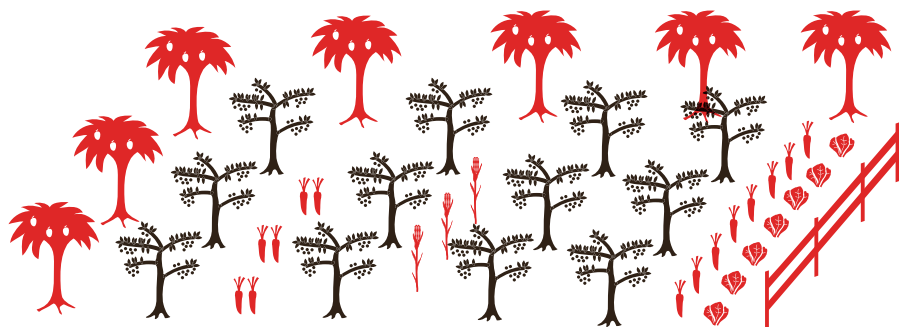
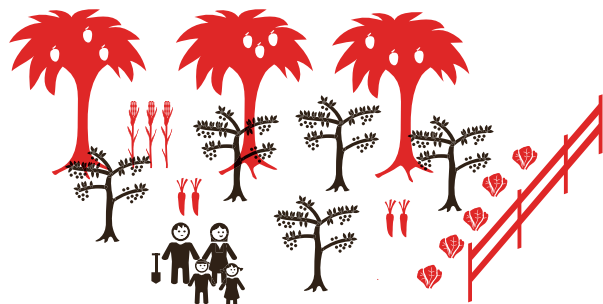
Figure 5: Nutrition-sensitive interventions according to different levels

- 22 Household /community**
- > Home/kitchen garden with nutrient rich vegetables and/or trees (in the soil or in plastic pots)
 - > Animal husbandry of chicken, ducks, goats, small fishponds



Smallholder farm & plantation

- > Intercropping of nutrient rich vegetables in the beginning of planting crops
- > Buffer zones, borders with nutrient rich vegetables and/or trees (on fences, along water streams, bordering rainforest)
- > Structural intercropping of nutrient rich trees for shadow / erosion control / firewood



Call to action

Undernutrition is not limited to the agricultural sector, but with existing programs that reach deep into farming communities, and a clear and ongoing commitment to sustainability, the agricultural sector is ideally placed to integrate the proposed nutrition interventions at scale.

Poor nutrition for farming families undermines private sector goals on productivity, quality, future supply and ethical behaviour. Therefore the primary source of investment of the proposed nutrition-sensitive interventions should come from companies wanting to strengthen their agricultural supply chains.

The 10 prioritized supply chains are particularly well-suited for nutrition interventions because of the strong infrastructure already in place, and with global consumers increasingly demanding ethically sourced products there is added incentive to invest in these commodity systems. By building the models which bring these sectors closer together, generating the evidence base on the link between nutrition, health and productivity, and by sharing the learning and best practice for replication and scaling up, it is possible to create dramatic and sustainable impact on the lives of farming families. We call on others, and especially companies sourcing from these systems, to invest in scaling up nutrition programming. The cost of these programs is relatively small, and the impact, both for workers and the workforces of tomorrow, is tremendous. Join us.

GAIN's upcoming program paper will further describe the nutrition landscape and recommendations for nutrition secure supply chains. For more detailed program information, please contact:
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Footnotes

- 1 21 commodities were selected according to production volume and size of global trade for 3 different segments: cash crops, food crops and nutritious food crops; investigation done by Fair & Sustainable <http://www.fairandsustainable.nl/>
- 2 > 30% of global production, undernutrition data per country available via: Demographic and Health Surveys (DHS), World Health Organization (WHO), Welthunger Index, etc
- 3 FAO: <http://faostat.fao.org/> and sector analysis
- 4 WHO : http://www.who.int/ceh/indicators/O_4stunting.pdf
- 5 UNICEF(2014) State of the world's children
- 6 From severe to mild degrees: haemoglobin <70.0 g/L until 100.0-109.0 g/L. <http://www.who.int/vmnis/indicators/haemoglobin.pdf>
- 7 From mild until severe degrees: for non pregnant women haemoglobin <80 g/L until 110.0-119.0g/l and for pregnant women haemoglobin <70.0 g/L until 100.0-109.0 g/L. <http://www.who.int/vmnis/indicators/haemoglobin.pdf>
- 8 Data collection done by F&S <http://www.fairandsustainable.nl/>
- 9 Cotton is differentiated into two supply chains: cotton raw material and textile production. Traders are for cotton production and brand owners for textiles.
- 10 Number 2 commodity in the world, but least globally traded one; only 5-7 % of global rice production is traded
- 11 The cashew market is scattered in medium size nut companies. Here only the biggest users of cashews are taken into account
- 12 The mango supply chain is differentiated into two routes: the fresh mango trade and the processed mangos trade for fruit juices. Here processed mangos are considered as inputs for fruit juices of major beverage companies
- 13 Fresh and processed pineapples

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Colophon

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Global Alliance for Improved Nutrition GAIN

Driven by a vision of a world without malnutrition, GAIN was created in 2002 at a Special Session of the U.N. General Assembly on Children. GAIN supports public-private partnerships to increase access to the missing nutrients in diets necessary for people, communities and economies to be stronger and healthier. With a current daily reach of over 811 million people in more than 30 countries, GAIN's goal is to improve the lives of one billion people by 2015 within the most vulnerable populations around the world through access to sustainable nutrition solutions.

Please visit us at www.gainhealth.org, follow us on Twitter @GAINalliance and like us on Facebook at www.facebook.com/GAINalliance.

