

Increasing coffee productivity through improved nutrition

A call to action



Global Alliance for Improved Nutrition (GAIN)
Centre for Development Innovation
Wageningen University & Research Centre

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Concept Brief

2 | Introduction

Under-nutrition is both a consequence and a cause of poverty. Childhood under-nutrition makes learning more difficult and ill health more likely, which hinders a child's capacity to secure a job as an adult, and the cycle of generational poverty and under-nutrition continues. UNICEF

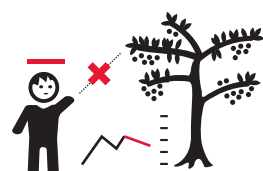
Coffee is grown in more than 50 countries and is the second largest export in the world after oil.¹ Millions of people are involved in the production and processing of coffee, and many more rely on it indirectly for their income. The coffee industry plays an important role in the economies of producing countries – it provides livelihoods for poor communities in remote rural areas. For these communities coffee is a cash crop that brings incomes to pay for food, schooling, healthcare and leisure.

The worldwide production of coffee in the growing year 2011-2012 totaled 8,074,080 tonnes.² Although there have been ups and downs over the past decades in total worldwide coffee production, there is a clear upward trend in production. The same is true for exports and consumption.³ Most coffee is produced in South America, featuring Brazil as the main producing country. Coffee is mainly produced by smallholder farmers.

Many smallholder coffee farmers and plantation workers' lack access to nutritious food and as a result suffer from severe malnutrition. Stimulating consumption of nutritious food will not only serve social and health interests of smallholder coffee farmers and plantation workers, but it will also serve broader commercial and developmental objectives by having a positive impact on productivity. In turn, increased productivity will keep up with growing worldwide demand for coffee and increase the income of smallholders.

This concept brief analyzes nutritional data in five major coffee producing and exporting countries. These countries have been chosen because they are major coffee producing countries (33% of global production), in which coffee production suffers most severely from the negative consequences of malnutrition among coffee producers. The publication demonstrates these consequences for the coffee-producing sector and maps the dimensions of under-nutrition in coffee producing areas in India, Indonesia, Vietnam, Kenya and Ethiopia. In sections 5 and 6, interventions for combining Good Agricultural Practices with Good Nutritional Practices are outlined. The final call for action shows the enormous potential that strengthening the link between the coffee sector and improved nutrition has in positively affecting the lives of millions of people.

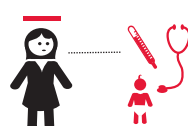
Consequences of insufficient nutrition in value chains



Decreased productivity



Poor school performance



Poor health

“1 % Reduction in height leads to 1.4 % reduction in productivity.”¹⁰

“1% Reduction in iron status (anemia) leads to 1% reduction in productivity.”¹¹

“Adults that were undernourished as children have 15% less cognitive capacity.”¹²

It has been assumed that increased food production, reduced food prices and growth of household incomes would contribute to poverty reduction and improved nutrition. However, in 2007 the World Bank demonstrated that simply increasing agricultural production and household income does not sufficiently reduce under-nutrition.⁴ Despite estimates that under-nutrition causes losses in GDP of 2-3%⁵, IFPRI reported that improvements to nutrition often lag behind economic development.⁶ FAO concluded in 2012 that agricultural growth will not necessarily result in better nutrition and calls for “nutrition-sensitive” agricultural growth to address under-nutrition and the related losses in GDP.⁷

Under-nutrition is not only caused by energy intake shortages (quantity of food), but also because of micronutrient shortages (quality of food). While too few calories (hunger) can be visible in individuals, the effects of micronutrient deficiencies (vitamins and minerals) are often hidden. Described as ‘hidden hunger’, this leads to underweight and stunted children. A larger number of people suffer from micronutrient deficiencies due to a monotonous diet, mainly in the form of staples and minimal nutrient-rich foods such as fruits and vegetables and animal-sourced foods.

Under-nutrition early in life has a significant effect on an individual’s future development. A lack of essential vitamins and minerals before two years of age has harmful consequences for physical and mental performance later in life. These consequences are irreversible. Moreover, under-nutrition is inherited from one generation to the other – an undernourished mother has a higher chance to deliver an undernourished child, which grows into an undernourished adult.⁸

For the coffee industry in particular, under-nutrition might lead to direct losses in coffee productivity from:⁹

1. Reduced labor output and physical productivity due to illness, fatigue and other health related problems.
2. Reduced cognitive development and educational performance due to malnutrition early in life.
3. Drainage of household resources to costly health care costs.

6 ||| Mapping of under-nutrition in major coffee production areas

Stunting

Children are too short for their age as result of poor diet and poor health circumstances.

A score of 25% or higher = serious level of under-nutrition that needs interventions



Child mortality

Child mortality refers to death of infants and children under the age of five.

In 2011, the world average was 5.1%.¹⁶

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



Studies of populations in coffee producing areas show severe under-nutrition. The following maps illustrate the overlap of under-nutrition and coffee production areas in India, Vietnam, Indonesia, Kenya and Ethiopia.¹³

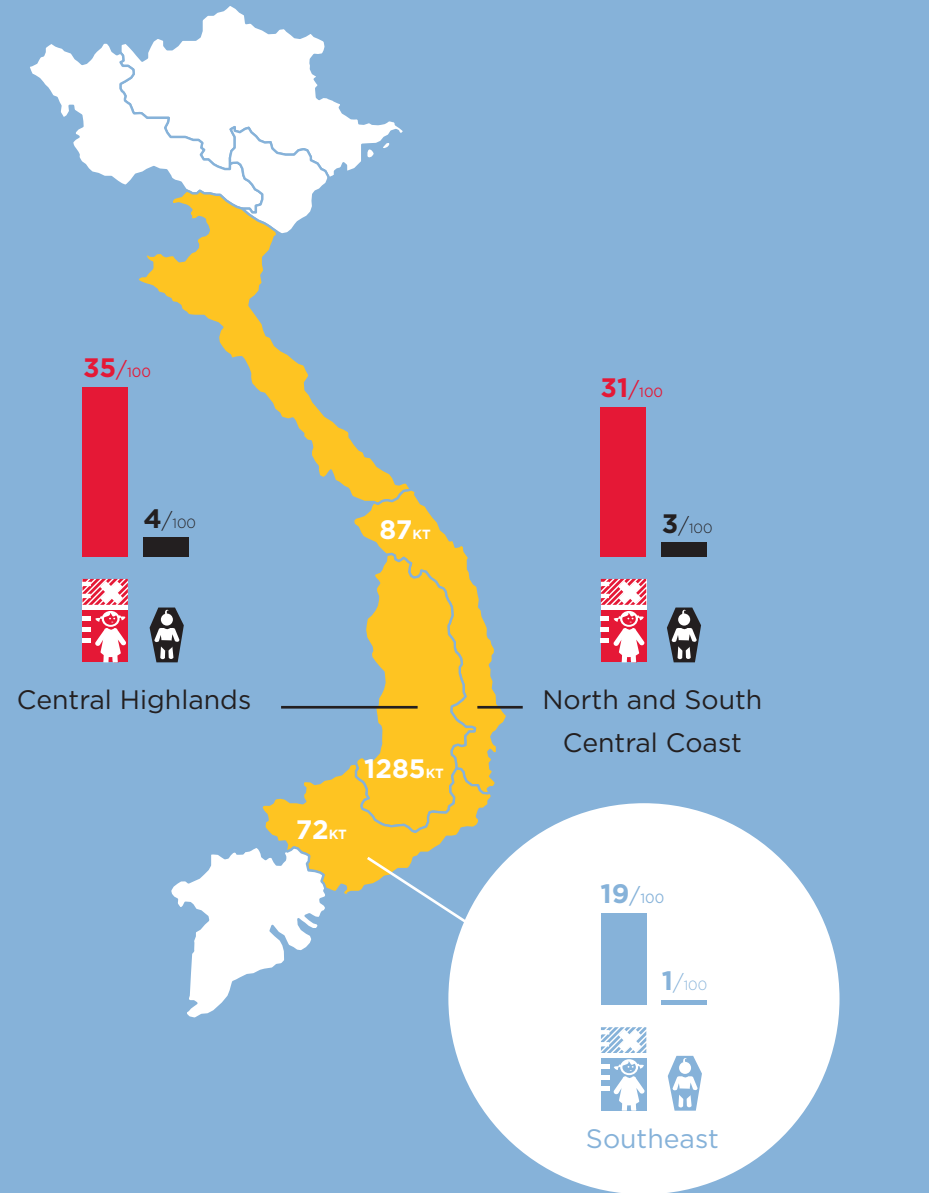
The most frequently used indicator for measuring under-nutrition is *stunting*, which is a visible sign of chronic malnutrition.¹⁴ *Stunting* means that children under 5 years old are simply not growing as result of poor diet, and are therefore too short for their age. As a rule, *stunting* prevalence above 25% signifies severe under-nutrition problems. If under-nutrition is not addressed early, the physical and mental damage is irreversible and leads to adults with limited labor productivity. Seventeen out of twenty-one coffee producing regions in India, Vietnam, Indonesia, Kenya and Ethiopia show *stunting* levels greater than 30%, which means there is an alarming prevalence of under-nutrition and that interventions are needed to address the problem. Shockingly, in all countries but Vietnam there are coffee producing regions in which *stunting* levels top 40%.

Under-nutrition causes people to be underweight, but it also affects immune and non-immune host defenses to infectious diseases making it an underlying cause of terminal infectious diseases. As much as 53% of child deaths can be attributed to being underweight making child mortality an important indicator in measuring under-nutrition.¹⁵ *Child mortality* refers to death of infants and children under the age of five. In 2011, the world average was 5.1%, but 31 countries reported at least 10% of children under five died.¹⁶ These rates are particularly high in Africa. In coffee producing regions in Ethiopia, more than 11% of children do not live to reach the age of five.¹⁷

1 Vietnam

Under-nutrition and coffee production

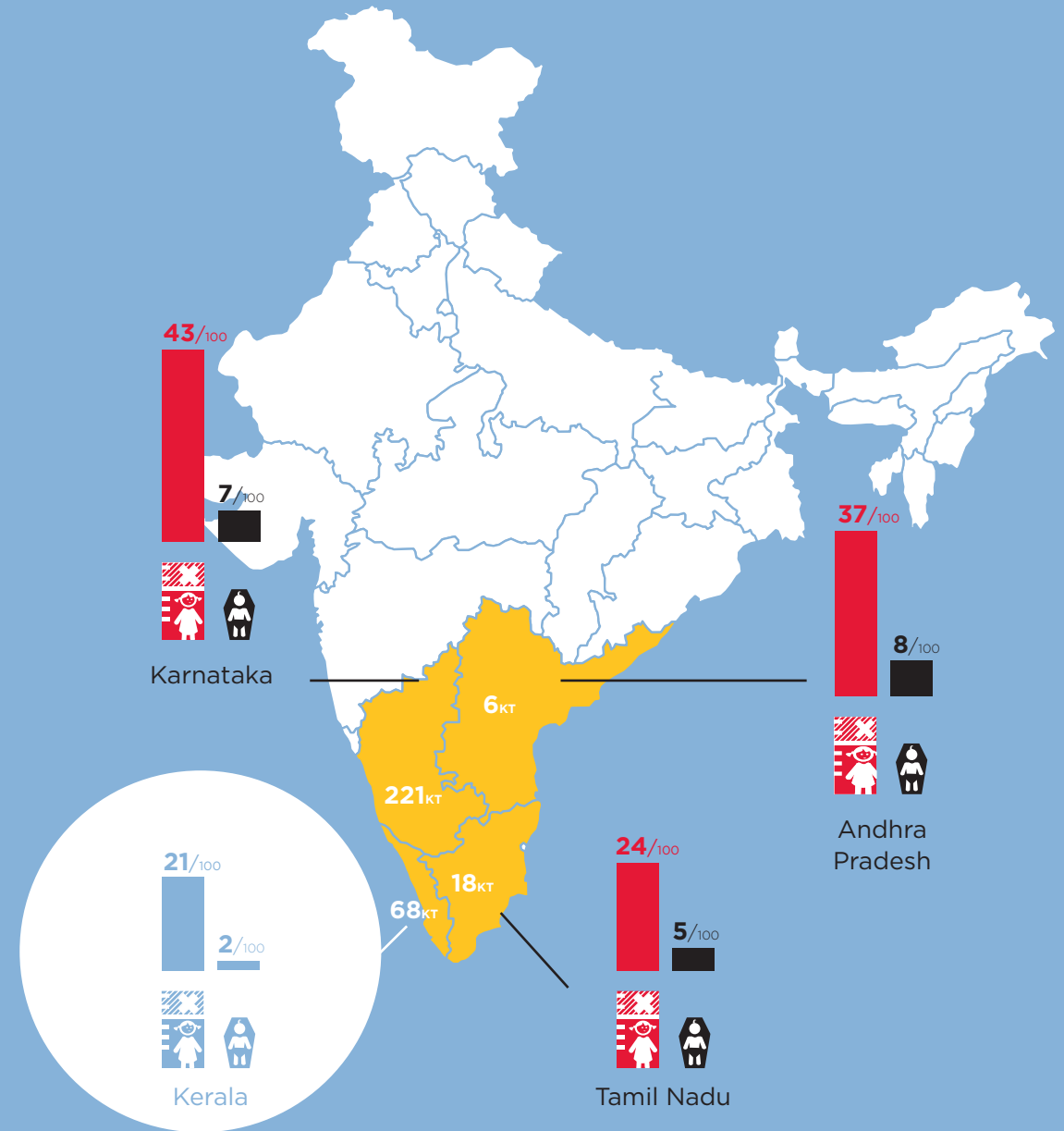
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2 India


Under-nutrition and coffee production


9





 **Stunting**
reduced height of children

 **Child mortality**
under the age of 5

 **Coffee production area**
Amount of production in KiloTonnes

 **Stunting**
reduced height of children

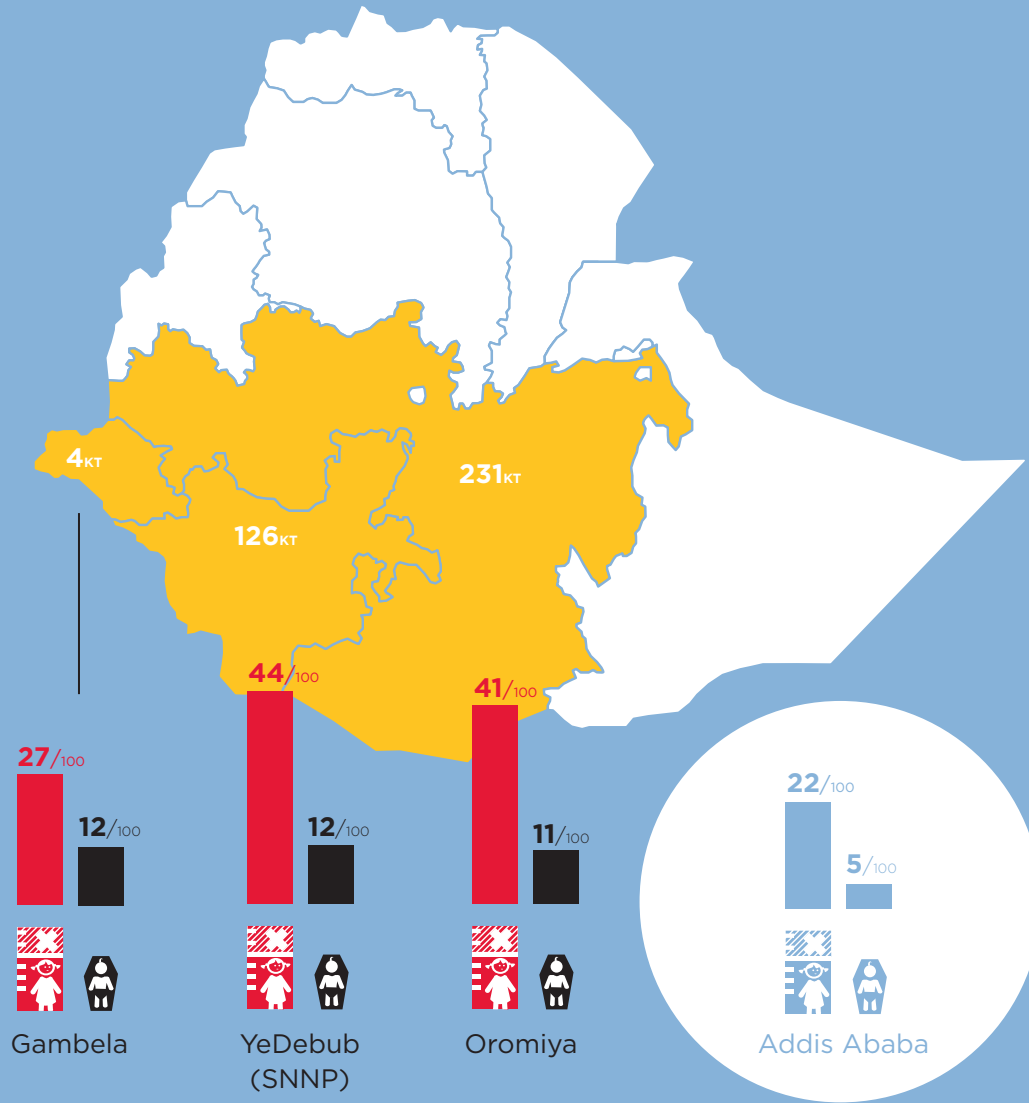
 **Child mortality**
under the age of 5

 **Coffee production area**
Amount of production in KiloTonnes

3 Ethiopia

Under-nutrition and coffee production

10



Stunting
reduced height of children

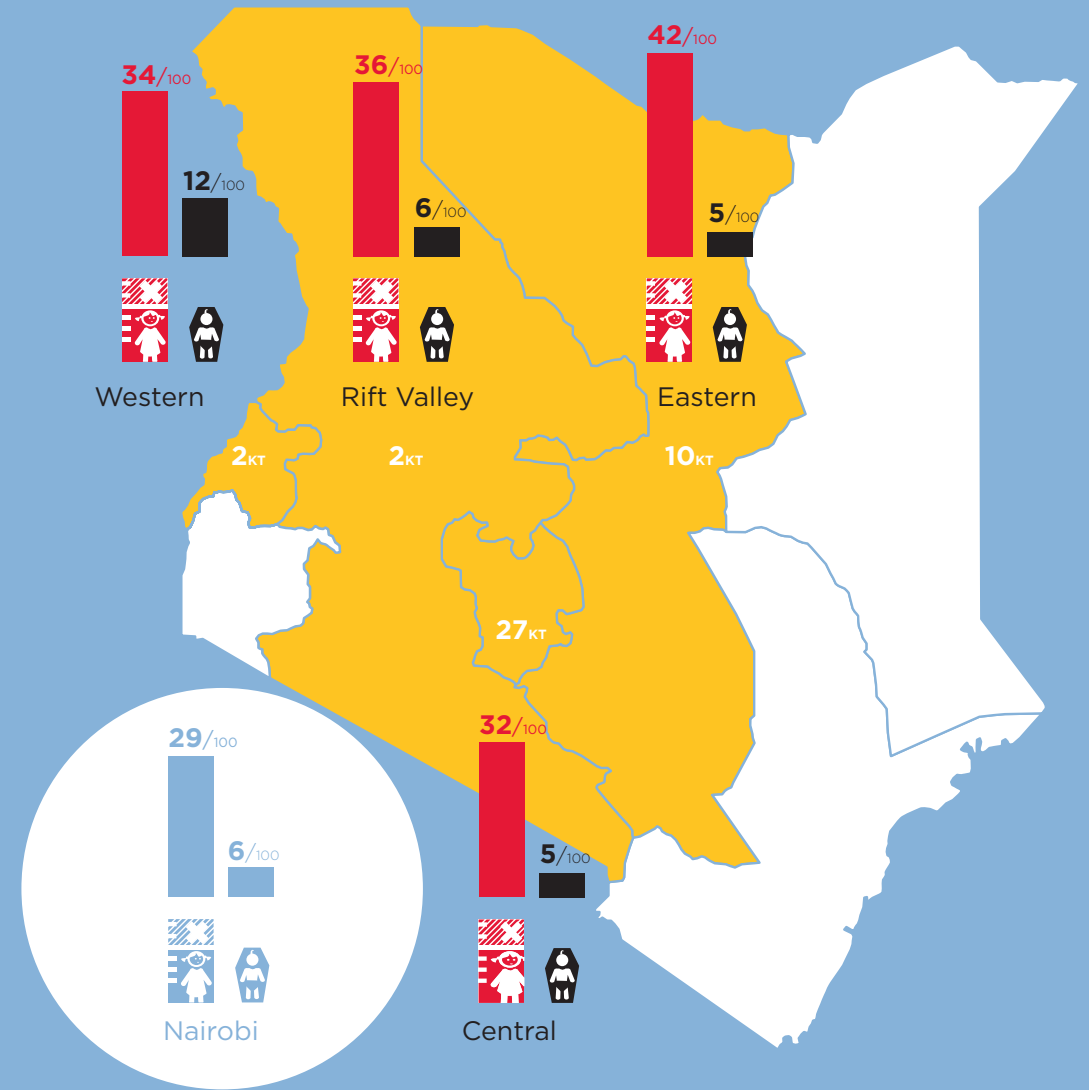
Child mortality
under the age of 5

Coffee production area
Amount of production in KiloTonnes

4 Kenya

Under-nutrition and coffee production

11



Stunting
reduced height of children

Child mortality
under the age of 5

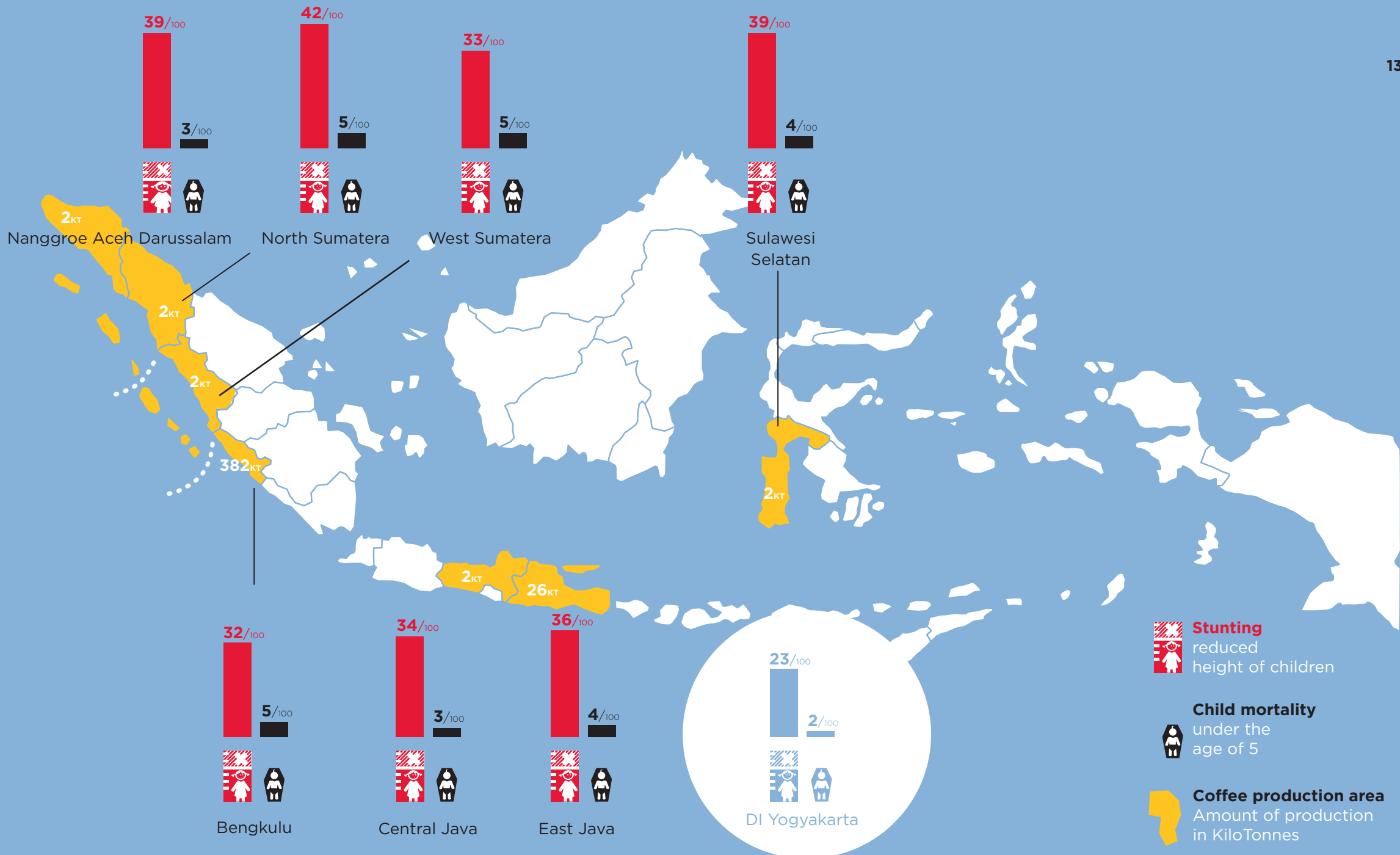
Coffee production area
Amount of production in KiloTonnes

5 Indonesia

Under-nutrition and coffee production

12

13



Overview

Under-nutrition and coffee production

Stunting
reduced height
of children

Child mortality
under the
age of 5

14

Vietnam

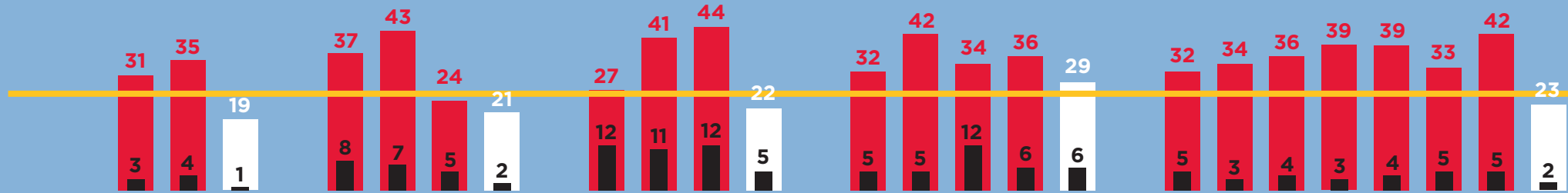
India

Ethiopia

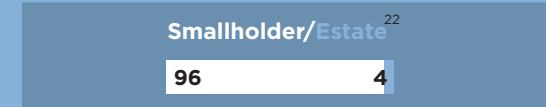
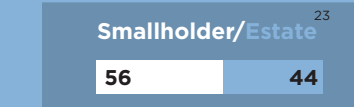
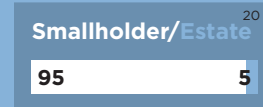
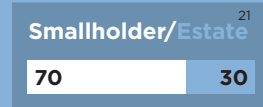
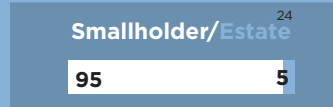
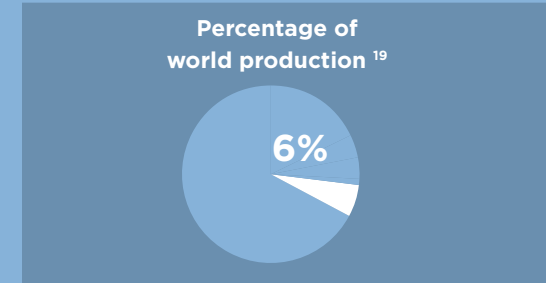
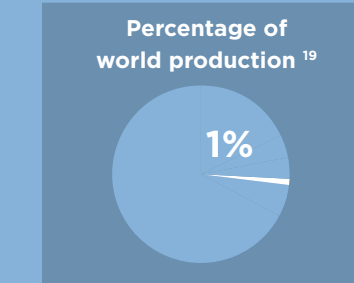
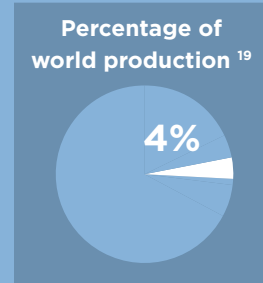
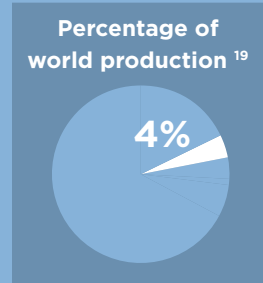
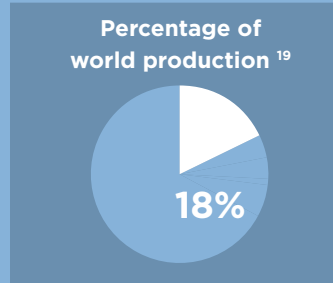
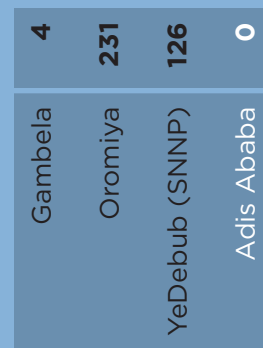
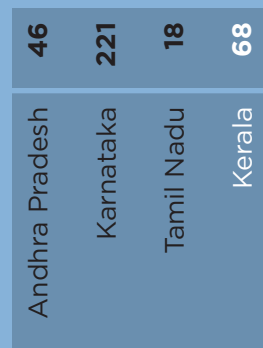
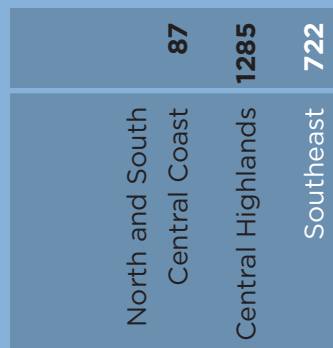
Kenya

Indonesia

15



Stunting
over 25:
Intervention
needed!



IV Nutrition status of producing families

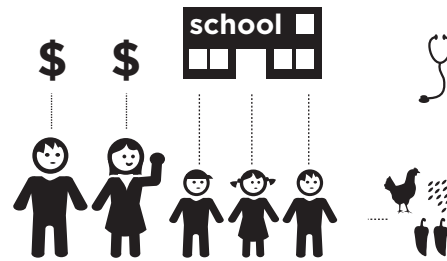
However, families in the coffee producing provinces in India, Vietnam, Indonesia, Kenya and Ethiopia face high under-nutrition leading to poor health, reduced educational potential, and diminished immediate and future income.

Healthy farming family

FEMALE EMPOWERMENT
The mother has decision-making power on expenditures

GOOD SCHOOL ATTENDANCE

Children attend school and are active



GOOD HEALTH

The family is healthy and not frequenting depending on medical services

GOOD FOOD

The family eats a wide variety of food daily (rice/maize, vegetables and animal products)

INCREASED PRODUCTIVITY

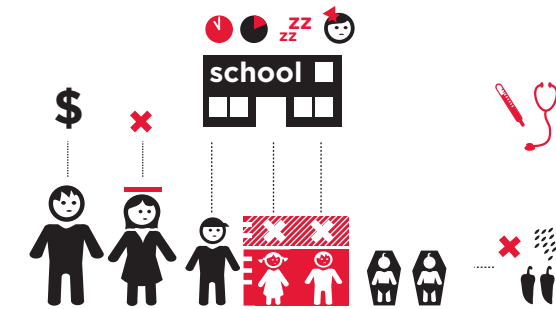
Agricultural production is improved due to higher labor productivity

Looking at a healthy farming household one can see that improved nutrition can increase productivity and reduce poverty through improved physical work capacity, cognitive development, school performance, and health.

Coffee farming family facing under-nutrition

POOR SCHOOL PERFORMANCE

Children attend school at a higher age, doubling of classes, often dropping out



LACK OF FEMALE EMPOWERMENT
as women have less labor productivity and time for family care

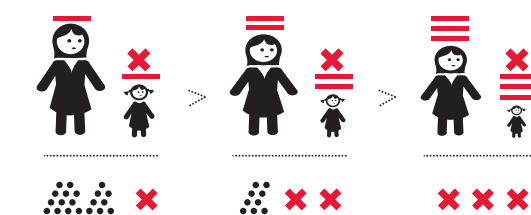
POOR HEALTH

Family members are more susceptible to illness and experience higher mortality rates from minor illnesses such as diarrhea

MALNOURISHED CHILDREN who are too small for their age, are often tired and inactive

DECREASED PRODUCTIVITY

Farmer produces less coffee due to reduced labour productivity



INTERGENERATIONAL CYCLE Undernourished children grow into undernourished adults

V How to remedy this?



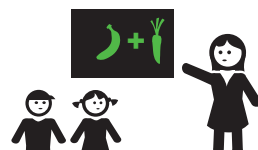
Nutrition sensitive value chains for local products



Increased nutritious food consumption through food diversification



Strengthening the role of women



Nutrition education

Certification is a procedure whereby an independent third party certification body gives a written assurance that the quality of the coffee and the production process has been assessed, and both confirm to the requirements specified by the standard systems. Being part of a certification program provides many opportunities for the producer. A few examples include training, access to markets, and enhanced efficiency and revenues. Four global certification standards are relevant for the coffee sector, namely: Fairtrade, Organic, Rainforest Alliance and UTZ Certified. Global certification programs are becoming more widespread in the past years.²⁵ A fifth influential collective standard for coffee is the 4C Association (Common Code for the Coffee Community).

Additional productivity gains might be achievable in the coffee sector if it invests in interventions promoting human nutrition security through a certification incentive. The following four interrelated interventions are designed to achieve improved nutrition for smallholder farmers in the coffee value chain and their households.^{26 27} Together they constitute a smart combination of Good Agricultural Practices and Good Nutritional Practices:

1. Nutrition sensitive value chains for local products:

Building nutrition sensitive value chains by first increasing local production, then preserving and marketing affordable nutrient dense foods (vegetables, fruits, animal based food products) to be sold in local markets. Sustainable improvements in the food basket can best be brought about through commercially viable value chains with push and pull factors.

2. Increased nutritious food consumption through food diversification:

Promoting household food production that includes a diversified basket of nutrient rich crops such as fruits and vegetables, and animal source foods such as eggs, chicken, fish and dairy products. A comprehensive behavioural change campaign will support this intervention.

3. Strengthening the role of women:

Ensuring women are empowered to make household decisions, especially to spend resources on improving nutrition for all family members at all stages of the lifecycle.

4. Nutrition education:

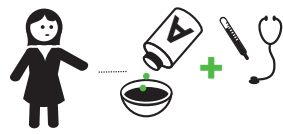
Raising awareness about good nutrition, health and sanitation practices through education programs.

These interventions can be integrated in coffee certification training programs. Organized farmer groups are the entry point for a) promoting household production of nutrient-rich crops, b) developing viable local value chains for animal-sources food products, and c) empowering women to make nutritious choices that benefit their families. In addition, coffee farmer groups provide a platform for linking nutrition education to agricultural production.

The four given interventions particularly fit the context in which smallholder farmers operate and live. However, under-nutrition is a serious problem among plantation workers as well.²⁸ As a leading underlying cause for disease, there is a clear link between under-nutrition and the relatively high prevalence of plantation workers who stay home because they are sick. When plantation workers do come to work, it is often in a weak physical condition due to a lack of consumption of healthy food. This could be overcome, for example, by providing affordable nutritious meals on the plantation site.



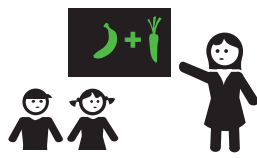
Encouraging backyard farming



Increased access to nutrient supplements by linking with public health services



Strengthening the role of women



Nutrition education

As plantations supply a significant amount of coffee in the world,²⁹ addressing these problems and at the same time increasing plantation workers' productivity will have a significant impact in raising worldwide production to meet growing demand. Four interrelated interventions proposed are:

1. Encouraging backyard farming:

Plantation workers may not have as much land of their own as smallholder farmers do, but they do have small plots surrounding their own houses where it is possible to grow vegetables and fruits or keep small animals. Encouraging plantation workers to produce the five most nutritious vegetables as well as raising chicken in their backyard for their own consumption can make a difference in improving diets for their households.

2. Strengthening the link with public health services for access to micronutrient supplementation:

Promoting programs in which plantation workers are provided with micronutrient supplements (Vitamin A, iron, zinc and iodine) have already sparked positive results at the plantation level for both worker health and productivity.³⁰ Plantation owners/management will have to cooperate with public health institutions. In some cases, like in India, programs for supplementation already exist and it is a matter of awareness and coordination of programs.³¹

3. Strengthening the role of women:

Ensuring women are empowered to make household decisions, especially to spend resources on improving nutrition for all family members at all stages of the lifecycle.

4. Nutrition education:

Raising awareness about good nutrition, health and sanitation practices through education programs.

By addressing the interventions described in combination with Good Agricultural Practices, local diets will be diversified and become more nutritious resulting in healthier and more productive coffee farmers and plantation workers. Ultimately, the industry benefits from a more productive future generation of coffee farmers and plantation workers and, consequently, a more sustainable coffee value chain.

22 **VI** Call to action

The NESCAFÉ Plan:

Responsibility goes beyond the cup!

23 Today, critical social and economic issues that have an influence at small-holder producer level include food insecurity and low productivity. These issues in combination with increased production costs lead to a drastic reduction of the producer's income, while the worldwide demand for coffee grows steadily.³² Under-nutrition plagues the majority of producers in the major producing countries such as Indonesia, India, Kenya, Vietnam and Ethiopia. Unremitting under-nutrition leads to a vicious cycle of undernourished coffee families over generations. As a consequence, under-nutrition contributes to continuing productivity losses in the coffee sector.

Looking at trends in the coffee sector, around 16%³³ of the global coffee production is currently certified. Due to the extensive commitments from major coffee companies, like Nestlé, Mondelez, DE Master Blenders, Tchibo and Starbucks, this share is estimated to reach over 25% by 2015.³⁴ Ideally certification standards will integrate training tools on nutrition security as a mandatory element in their curriculum in areas of high malnutrition and coffee production for smallholders and plantation workers.

Addressing nutrition security can be achieved by combining Good Agricultural Practices with Good Nutritional Practices, developing nutrition sensitive value chains for local products, increasing household production of nutritious foods, strengthening the role of women and educating people about the importance of nutrition.

Investments in better nutrition have an exceptionally high benefits to cost ratio.³⁵ We encourage the coffee industry to invest in nutrition sensitive coffee chains in areas experiencing high rates of malnutrition to prevent future generations of undernourished coffee producers and plantation workers with decreased productivity.

VII Footnotes

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- 6 IFPRI (2011): *Global Hunger Index*
- 7 FAO (2012) *State of Food Insecurity in the World 2012*
- 8 This inter-generational cycle can be broken by good nutrition to mother and child. This window of opportunity to address under-nutrition is known as the 'first 1000 days', from conception until 2 years of age.
- 9 Copenhagen Consensus (2012): <http://www.copenhagenconsensus.com/Projects/CC12.aspx>
- 10 Behrman and Rozenzweig (2001) / Hunt (2005) The strongest and best documented productivity-nutrition relationships are those related to human capital development in early life. Height has unequivocally been shown to be related to productivity, and final height is determined in large part by nutrition from conception to age two. A 1% loss in adult height as a result of childhood stunting is associated with a 1.4 percent loss in productivity.
- 11 Behrman and Rozenzweig (2001) / Hunt (2005)
- 12 Grantham-McGregor, S., Fernald, L. and Sethurahman, K. (1999), *Effects of Health and Nutrition on Cognitive and Behavioral Development in Children in the First Three Years of Life*. Malnutrition leads to indirect losses in productivity from poor cognitive development and schooling. Low birth weight may reduce a person's IQ by 5 percentage points, stunting may reduce it by 5 to 11 points, and iodine deficiency by as much as 10 to 15 points

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Data are collected from the following sources:

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Child Mortality

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UNICEF (2011): *The Situation of Children in India: A Profile.*

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Stunting

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*(Disclaimer) Ethiopian regional coffee production data was calculated by applying regional percentages from the Ethiopian Ministry of Trade report to the national production figure. These figures should therefore be seen as estimations.

Global Agricultural Information Network (2012): *Vietnam Coffee Annual 2012.*

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Indonesian Ministry of Agriculture (2012): *Luas Areal dan Produksi Perkebunan Report.* http://ditjenbun.deptan.go.id/statistikbun/Luas_Areal_dan_Produksi_Perkebunan_report.php?a=integrated&ctlSearchFor=&simpleSrchFieldsComboOpt=&simpleSrchTypeComboNot=&simpleSrchTypeComboOpt=&criteria=and&type1=&value1=2011&field1=STABUN_TAHUN&option1=Equals¬1=&type2=&value2=11&field2=T_KO-MODITAS_ID&option2=Equals¬2

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28 Colophon

© 2013, Increasing coffee productivity
through improved nutrition
A call to action, Concept Brief

Global Alliance for Improved Nutrition (GAIN)
Centre for Development Innovation-
Wageningen University and Research Centre

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Innovation for sustainable and equitable development CDI

At the Centre for Development Innovation (CDI) we focus on the global challenges of food & nutrition security, sustainable markets, adaptive agriculture, ecosystem governance and conflict, disaster & reconstruction. CDI has forty scientific staff members that are active within these particular themes and are supported by 20 project support staff members. We link cutting-edge processes of innovation and learning with Wageningen UR's world-leading scientific and technical expertise.

Our work fosters collaboration between citizens, governments, businesses, NGOs and the scientific community. Our worldwide network of partners and clients links with us to help facilitate innovation, create capacities for change and broker knowledge.

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 667 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.

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