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# Vietnam



## A Business Case For Sustainable Coffee Production

An industry study by TechnoServe for the Sustainable Coffee Program.

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Vietnam remains the world's most competitive coffee producer with the lowest global cost of production and an extremely efficient supply chain. Virtually all of Vietnam's coffee is produced by smallholder farmers.

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More than 25% of Vietnam's production is verified or certified "sustainable". This has been achieved in a relatively short period of time as a result of exporters focusing on high-producing farmers.

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Most of Vietnam's production should be verified or certified by 2016 as a result of competition for market share; we expect these same competitive forces to drive down the incremental cost of verification paid by the industry.

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This process will bring the entire sector to a documented, baseline compliance quickly and cheaply, but is unlikely to address Vietnam's most pressing sustainability challenges: excessive agro-chemical use and scarce water resources.

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There are incentives for farmers, government and the coffee industry to address these challenges and safeguard coffee farmers' livelihoods, long-term coffee supply, and environmental assets for future generations. However, "business as usual" is unlikely to unlock these actions. A catalyst will be required.

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# Executive Summary

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**Vietnam remains the world's most competitive coffee producer,** accounting for nearly 60% of global Robusta exports. Cost of production is significantly below other origins. Yields are among the highest in the world and have been increasing steadily over the past three decades. The supply chain is extremely efficient, with high competition between locally-owned and multinational exporters. These attributes give Vietnam a strong competitive advantage as the world's most efficient, lowest cost coffee supplier.

**Vietnam's coffee is produced almost entirely by smallholder farmers.** Smallholder farmers account for over 95% of total production and are concentrated in Vietnam's Central Highlands. Farmers have approximately 1 hectare of coffee on average and manage the majority of farming activities through family labor. Most farmers are not organized in groups or cooperatives and sell their coffee (in green form, after hulling) to local collectors, who aggregate volumes for delivery to exporters. The small-scale nature of the collectors and the lack of farmer organization mean that exporters are the primary catalyst for bringing farmers into sustainability schemes.

**We anticipate that most Vietnamese coffee will be verified "sustainable" by 2016.** By the end of 2012, more than 25% of Vietnamese supply was verified or certified. This was achieved from a near zero base within five years by exporters focusing on the largest, highest-yielding farms. Exporters charge roasters a small premium for verified coffee. In the coming years, we expect competition for market share will drive exporters to find lower-cost ways of reaching farmers and verifying supply chains. Accordingly, we expect verified supply will increase (as a share of overall exports) and the incremental charge for verification to decline.

**Verification schemes are unlikely to address Vietnam's most pressing sustainability challenges.** These challenges include diminishing soil fertility, as result of excessive fertilizer use, and depletion of groundwater supply, as result of unchecked irrigation. Farmers currently view over-fertilizing and over-irrigating as ways of hedging a high yield. While the verification process will provide a framework for sustainable production, it is unlikely to shift farmers' behaviors in this regard.

**Fortunately, there is a compelling business case for the supply chain to tackle these challenges.** Farmers stand to benefit from reduced costs, higher income in the long-term, and a farm that is sustainable for future generations. The government also has an interest in sustaining export earnings while safeguarding the country's environmental assets. The global coffee industry has an interest in ensuring long-term supply from an important origin. The alternative to a change in farming practices is likely to involve faltering yields (as result of gradual soil acidification and exhaustion) and steady depletion of water reserves, which, in the event of prolonged drought, could limit irrigation and greatly affect production. These threats, which may seem distant now, should serve as a call to action for co-investment in training and reinforcing sustainable coffee production.

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# Context

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**Global demand for sustainable coffee is rising**

Under the IDH umbrella, major coffee roasters have set a goal of increasing global sustainable coffee sales from 8% to 25% by 2015. This ambitious target can only be met through coordinated effort on the part of stakeholders and targeted investments at different stages in the supply chain.

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**Not all countries and producers will be able to meet this demand**

Many of the world's coffee farmers will find it challenging to be verified or certified. These challenges vary by country and type of producer. In some cases, rising costs of production make it hard to absorb the additional cost of sustainability certification or verification relative to the economic benefits. In other situations, farmers are not of sufficient scale or are not aggregated in such a way that the economics can be justified.

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**Vietnam, however, is well positioned**

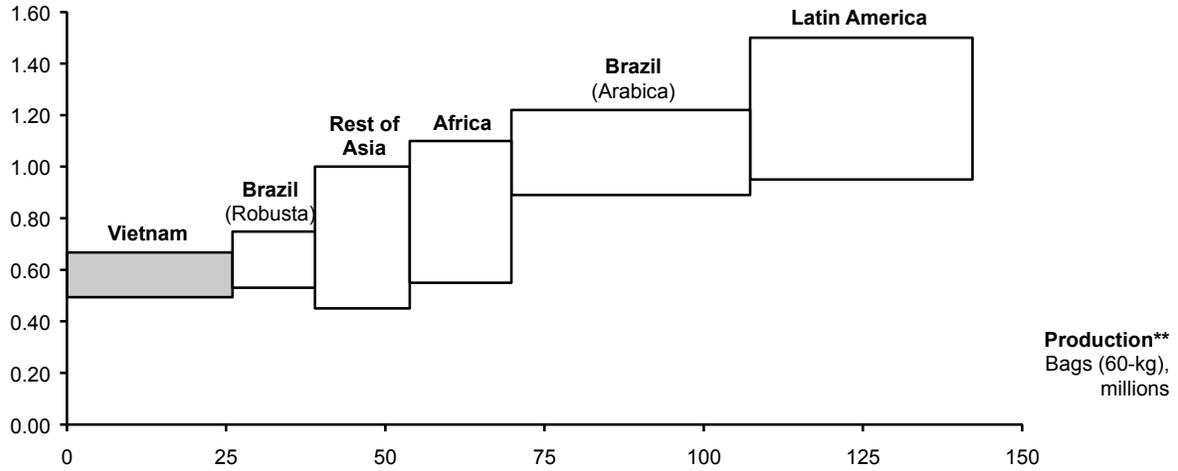
Vietnam remains the world's most competitive coffee producer with a cost of production significantly below the nearest origin (see Exhibit 1). This cost advantage also applies to the incremental costs of certifying or verifying sustainability, which are lower on average in Vietnam than in other countries.

Vietnam's coffee supply chain has several features that overcome the challenges of aggregation faced in other coffee origins. First, while farmers are not formally organized into aggregated units (e.g., cooperatives), exporters are able to leverage their relationship with collectors and aggregators to form large group schemes. Second, despite farm sizes being relatively small (one hectare on average), yields are the highest in the world. The relatively low cost of aggregating farmers through group schemes and the relatively high volume per farmer makes verification more cost-effective in Vietnam than in other countries (see Exhibit 2).

## Exhibit 1

## Vietnam is the world's lowest cost coffee producer

Estimated cost of production range\*  
US\$ per pound green



\* Excludes cost of verification / certification; lower bound of range does not value family labor contributions; upper bound of range assigns value to family labor (but not the opportunity cost of time or land) and considers less efficient producer archetypes

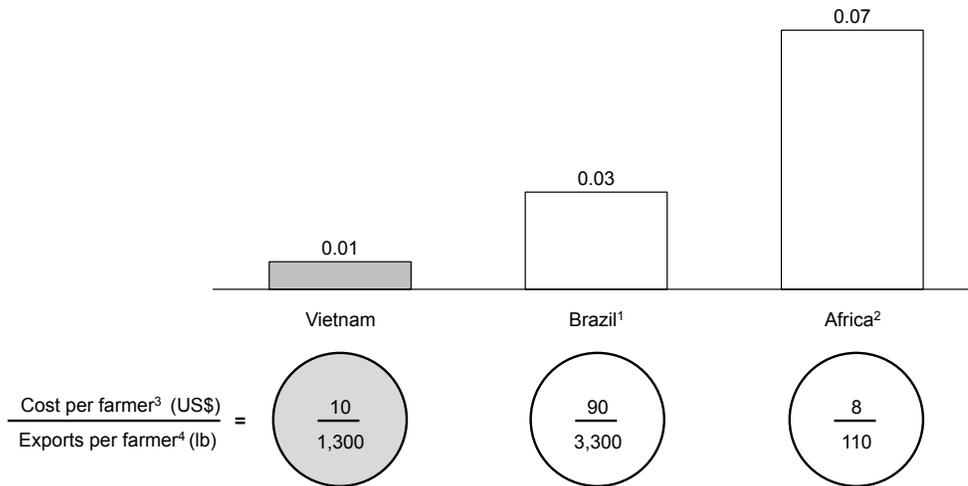
\*\*Vietnam (97% Robusta), Rest of Asia (>70% Robusta), Africa (>50% Arabica), Latin America (<5% Robusta)

Source: interviews with international coffee trade; Macquarie; USDA; TechnoServe analysis for IDH

## Exhibit 2

## Verification is cost-effective in Vietnam

Group verification costs  
US\$ per pound green



<sup>1</sup> Small family farm (5 ha, Arabica)

<sup>2</sup> Average of Ethiopia and Uganda smallholders

<sup>3</sup> Annual cost; includes auditing, one training session (group, classroom-based), and basic Internal Control System (ICS) management

<sup>4</sup> Pounds; assumes 25% of farmers' total verified production is exported as "sustainable"

Source: Kuit Consultancy; P&A; TechnoServe analysis

# Economics of Coffee Production in Vietnam

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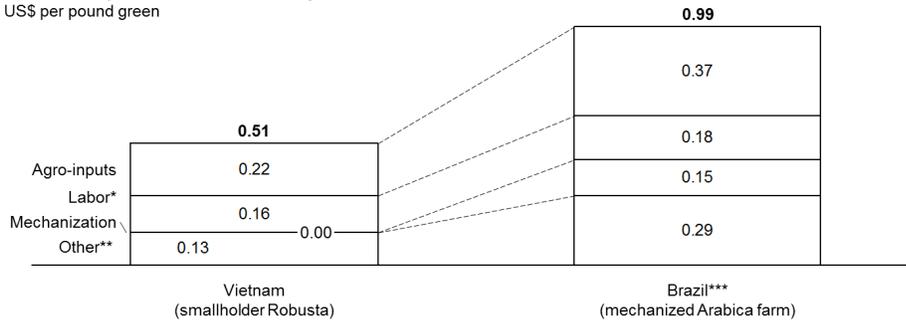
<b>A smallholder crop</b>	Coffee provides a livelihood for half a million Vietnamese smallholder farmers. 95% of Vietnam's coffee is grown on small family farms of approximately one hectare.
<b>Lower labor and input costs</b>	With the exception of harvesting, smallholders are able to keep cash labor costs to a minimum using their own labor to maintain the family plot. Nitrogen-based fertilizer, farmers' largest single cash cost, is also cheaper than in other countries. These factors give Vietnam a lower production cost compared to other producing nations such as Brazil, where farms are larger and require more hired labor and fixed capital assets (see Exhibit 3).
<b>The highest yields in the world</b>	Vietnamese farmers enjoy coffee yields significantly higher than other coffee producers around the globe (see Exhibit 4). Irrigation and access to agro-inputs have played a critical role in Vietnam's ability to consistently achieve high yields. Nearly all smallholder farmers construct their own wells and pump water for irrigation. Agro-inputs are accessible and widely utilized. Higher yields translate into a significant cost advantage.
<b>An enabling environment that promotes efficiency</b>	The enabling environment in Vietnam's coffee sector promotes efficiency, reduces waste, and lowers costs. Farmers have access to land rights that permit land to be bought, sold, and used as collateral for loans. Gradual reforms transferred roles in the coffee industry from the state to the private sector. Strong private sector competition combined with few taxes, levies, quotas or production controls has led to an extremely efficient industry where intermediary costs are low and coffee farmers receive more than 90% of the export price.
<b>A competitive cost position that translates into higher incomes for farmers and growing market share</b>	<p>As a result of the factors outlined above, coffee farming is highly profitable for smallholder farmers in Vietnam. In 2012, this generated over US\$1 billion in net income for the smallholder coffee farmers of Vietnam.</p> <p>While the rest of the world's Robusta exports have remained largely unchanged over the past 20 years, Vietnam has increased its production tenfold (see Exhibit 5) and its market share to 60% of all global Robusta exports.</p>

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### Exhibit 3

### Farming costs are lower in Vietnam than in Brazil

**Cash cost of production, farm-level only**  
 US\$ per pound green



\* Excludes value of family labor

\*\* Includes maintenance, depreciation, financing, and primary processing (hulling)

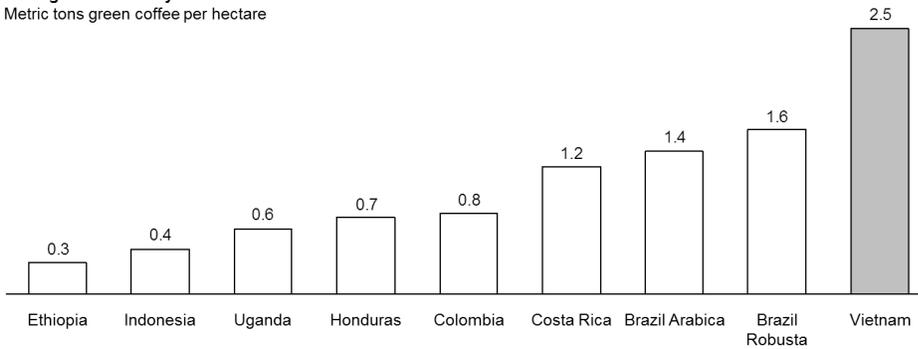
\*\*\* Based on *Cerrado* area of Minas Gerais; large mechanized farm (>60 ha, yielding 32 bags/ha)

Source: Kuit Consultancy; P&A; TechnoServe analysis

### Exhibit 4

### Vietnam has the highest yields in the world

**Average coffee farm yields\***  
 Metric tons green coffee per hectare

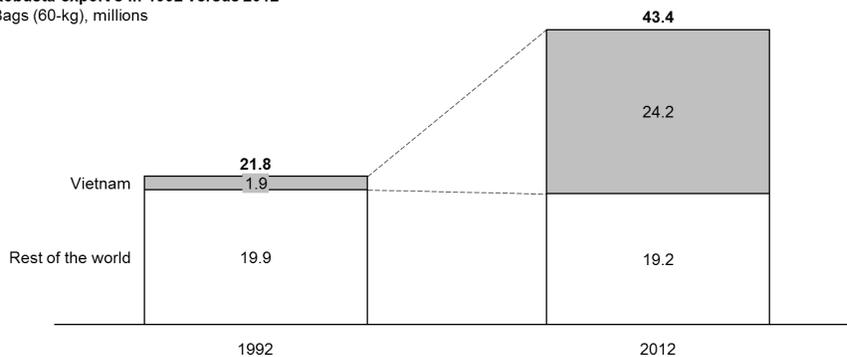


\*National average based on total production (average of last two crops) and area under coffee; includes both Arabica and Robusta unless noted otherwise  
 Source: USDA; TechnoServe analysis

### Exhibit 5

### Vietnam has an unrivaled market share for Robusta exports

**Robusta exports in 1992 versus 2012\***  
 Bags (60-kg), millions



\*Raw (green bean) exports; excludes soluble coffee exports that may be Robusta-based  
 Source: USDA; TechnoServe analysis

# Emerging Sustainability Trends

**Over 25% of production currently “sustainable”**

By the end of 2012, more than 25% of Vietnam’s coffee production was certified or verified sustainable. This has been achieved from a near zero base within five years and particularly within the past 24 months by exporters focusing on high producing farms with above average yields and larger farm sizes (see Exhibit 6).

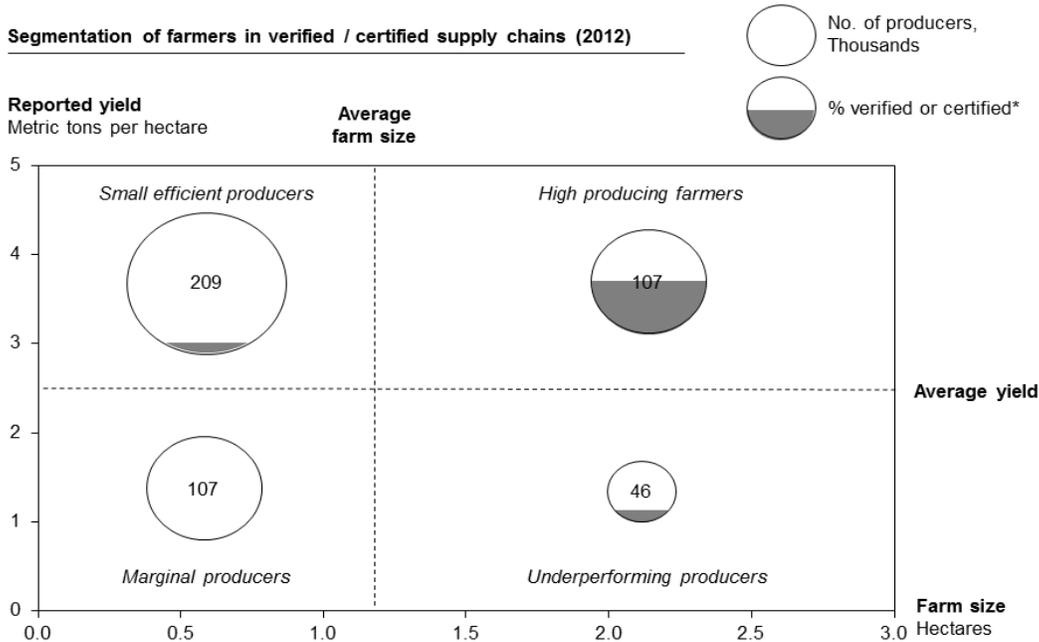
**Verification costs and premiums likely to fall**

Economic constraints often inhibit the expansion of verification; however, this is unlikely to be an issue in Vietnam. Most Vietnamese farmers should be able to meet threshold sustainability criteria (e.g., 4C’s 10 Unacceptable Practices) without significant investment in training or infrastructure. As result, exporters are able to form group verification schemes and document compliance at little incremental cost, but pay a premium to farmers and intermediaries to secure supply. These premiums are eroding as exporters compete for market share. Meanwhile, costs are falling as result of improving economies of scale. These forces should compress the overall incremental cost / premium associated with verified coffee sales, from current levels of \$40 to under \$10 per ton by 2016.

**Majority of crop should be verified or certified by 2016**

As costs fall and the share of farmers included in verification schemes increases, the cost of documenting baseline compliance will likely become absorbed into the supply chain. We expect this process to be complete as early as 2016, with 80% of Vietnam’s production part of a verified supply chain.

**Exhibit 6 So far, sustainability programs have focused on high producing farmers**



\* High producing farmers, 50%; Underperforming farmers, 13%; Small efficient farmers, 5%; Marginal producers, 0%   
 Source: International certification and verification groups; FAO; Kuit Consultancy; TechnoServe analysis

# Challenges of Current Trajectory

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**Verification unlikely to solve long-term sustainability challenges**

Vietnam faces several looming sustainability challenges, which are beyond the scope of verification schemes to address. These challenges are unique to Vietnam. They include diminishing soil fertility, as result of excessive fertilizer use, and depletion of groundwater supply, as result of unchecked irrigation. Farmers currently view over-fertilizing and over-irrigating as ways of hedging a high yield. Collectively, however, these practices threaten the long-term viability of the sector and farmers' livelihoods.

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**Addressing these challenges requires changing farmers' behaviors**

While the verification process provides a framework for sustainable production, it is unlikely to change farmers' fertilization and irrigation practices. Changing farmers' behaviors will require training, overcoming vested interests in the status quo, and creating incentives to keep compliance up.

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**Training can be effective, but costly**

There are existing projects in Vietnam that illustrate the quality and intensity of training required to shift farmers' practices. Typically the most effective training approach is a "farmer field school". It is also the most costly. A farmer field school costs about \$70 per farmer per year (when running at large scale) and features small group sessions, demonstration plots, local trainers, and participatory teaching methods. In comparison, a traditional, classroom or lecture-based training program could be run for less than \$15 per farmer per year.

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**Vested interests need to be overcome**

Nearly 80% of Vietnam's NPK fertilizers are blended locally by state-owned enterprises. These NPKs are cheaper than imported alternatives, but also tend to be of lower quality and available only in generic ratios. An improved system would expand access to soil testing and customization of higher-quality NPK blends, but could undermine state-owned fertilizer companies' dominance and small-scale agro-dealers' business model of "over-selling" products to farmers.

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**Compliance incentives need to be created**

Farmers are likely to continue over-irrigating so long as water is viewed as a free, unlimited resource. Economic incentives can improve compliance. To create such incentives, the sector first needs a baseline understanding of groundwater availability and drawdown scenarios in the Central Highlands. From there, different options exist for government to track and control water consumption.

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**A catalyst is required**

There are benefits for farmers, government and the coffee industry to address these challenges and safeguard coffee farmers' livelihoods, long-term coffee supply, and environmental assets for future generations. However, a catalyst will be required to unlock action.

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# The Risk of Declining Soil Fertility

## Over-fertilization is causing soil fertility decline

Vietnam's coffee tree stock and soils are still relatively young. In the past, these favorable demographics allowed Vietnam to achieve breakthrough yields with little precision given to the fertilization regimen. In the future, as trees age and soils lose their inherent fertility, greater precision will be required.

Excessive application of nitrogen-based fertilizers (e.g., urea, generic NPKs) is the most common problem. Over time, excess N leads to soil acidification. Highly acidic soils are inefficient at transferring nutrients from the soil to the plant, causing those nutrients to be wasted and capping tree yields below their potential.

## Farmers can get by with fewer, but higher quality, inputs

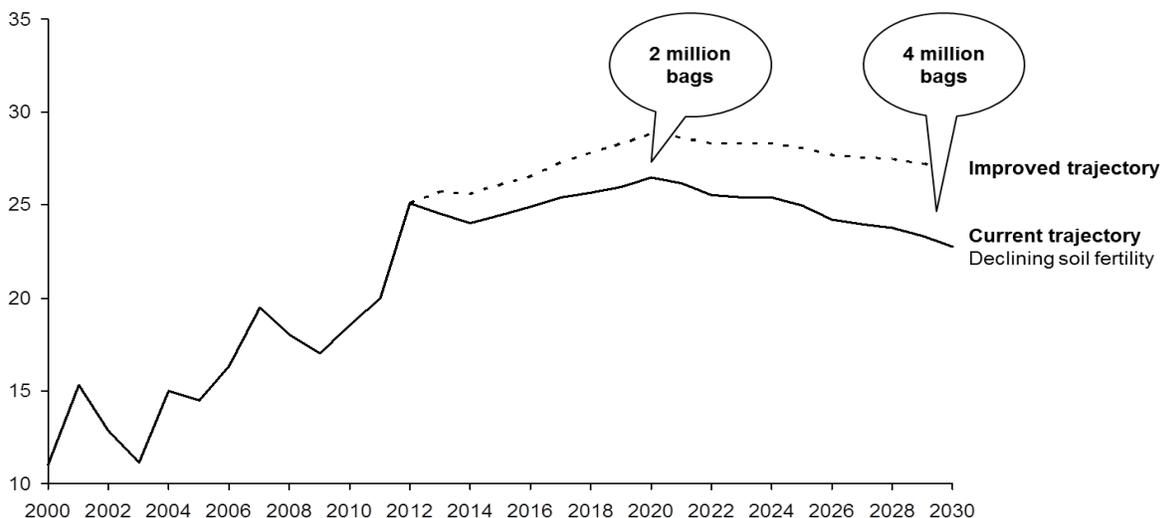
Averting soil fertility decline entails soil testing and customizing fertilizer applications accordingly. Imported "compound" fertilizers are more expensive than locally-produced "bulk" blends, but offer improved precision and efficacy. Multiple field trials have shown that farmers can achieve a net savings by using lower volumes of higher quality fertilizer and supplementing with other inputs such as lime and foliar feed.

## Impact could be 2 million bags by 2020

If the current trend towards over-fertilization is maintained, Vietnam's smallholders are likely to experience the effects of soil exhaustion. This would cause their yields to plateau and then start dropping off around 2020. On the other hand, improved fertilization practices would allow high yields to be sustained for longer, saving the sector 2 million bags annually by 2020 and as much as 4 million bags by 2030.

### Exhibit 7 Declining soil fertility could reduce the crop potential by 2 million bags by 2020

Modeled Vietnam smallholder Robusta production\*  
Metric tons, millions



\* Theoretical model holding external factors constant (e.g., normal rainfall patterns, etc.) and assuming no new planting  
Source: USDA; FAO; DCP-MARD; IPSARD; Kuit Consultancy; TechnoServe analysis

# The Risk of Groundwater Depletion

## Farmers use more than double the water they need for irrigation

Irrigation is critical to Vietnam's success at achieving high yields. Without irrigation, coffee trees would struggle to survive the country's extended dry season.

Most of Vietnam's smallholders irrigate by pumping groundwater from shallow wells located on their farms. Whereas under-irrigating carries the risk of a crop failure, over-irrigating is viewed by farmers as "insurance" for a high crop. Farmers do not monitor their water extraction rates. On average, they use more than double the amount of water required. Farmers pay for this wastage through higher energy costs (i.e., the fuel or electricity that operates the pump), but they do not pay for the water itself. This situation creates little economic incentive for farmers to change their practices.

## Unsustainable practices threaten groundwater reserves

Collectively, the practice of over-irrigation threatens to deplete the Central Highland's groundwater reserves. (Over 90% of the demand for water in the region is for coffee irrigation.) Although groundwater reserves are replenished annually during the rainy season, there is no monitoring system in place during the dry season to ensure stocks are managed sustainably and equitably across the Central Highlands.

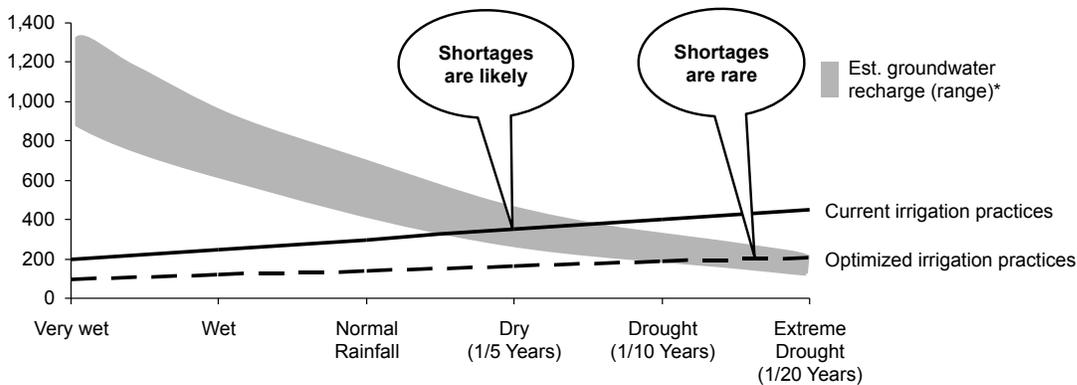
## Shortages could cause crop failure and resource conflicts

In 2005/6, drought caused water shortages and wells to dry up. Many farmers were unable to irrigate sufficiently. The impact was a 20% drop in national production, equivalent to 3 million bags of the crop. This national figure masks localized differences: some farmers took enough water and experienced no crop losses; others ran out of water and lost more than half their crop. Competition for water in times of scarcity could become a source of conflict in communities.

At current irrigation levels, Vietnamese farmers are likely to experience mild water shortages once every five years and an acute shortage (such as in 2005/6) once every 10 years (see Exhibit 9). However, if irrigation can be optimized and reduced, the risk of shortage is minimized even in severe drought years.

### Exhibit 8 Current irrigation practices are likely to lead to water shortages

Estimates of annual groundwater recharge and extraction rates under different rainfall scenarios (Dak Lak)  
Millimeters



\*Various factors affect groundwater recharge as result of normal precipitation, including surface runoff and crop evapotranspiration

\*\* Coffee irrigation accounts for over 90% of groundwater extraction in Dak Lak; other uses (not modeled) include household requirements and industry

Source: D'Haese 2004; rainfall data averages from 30 years (FAO prior to 2002; private sector source 2003-2012)

# The Business Case for Addressing These Risks

## Farmer incomes could be increased

More sustainable farming practices could help conserve these environmental assets and increase coffee farmers' net incomes over 30%, from a base of about \$1,500 per year (at current coffee prices). Three factors have potential to lead to increased farmer income: sustained, higher yields; reduced fertilizer expenditure; and reduced energy expenditure (for irrigation).

## Sustained, higher yields

Farmers could use soil testing to optimize their fertilizer selection, reducing overall input requirements and averting soil fertility decline. Improved agro-input practices could boost yields by 10% in the short-term and prevent yields from falling off in the long-term. Rationalized irrigation practices would allow high yields to be sustained even in drought years, without compromising production in normal rainfall years.

## Fertilizer and energy cost savings

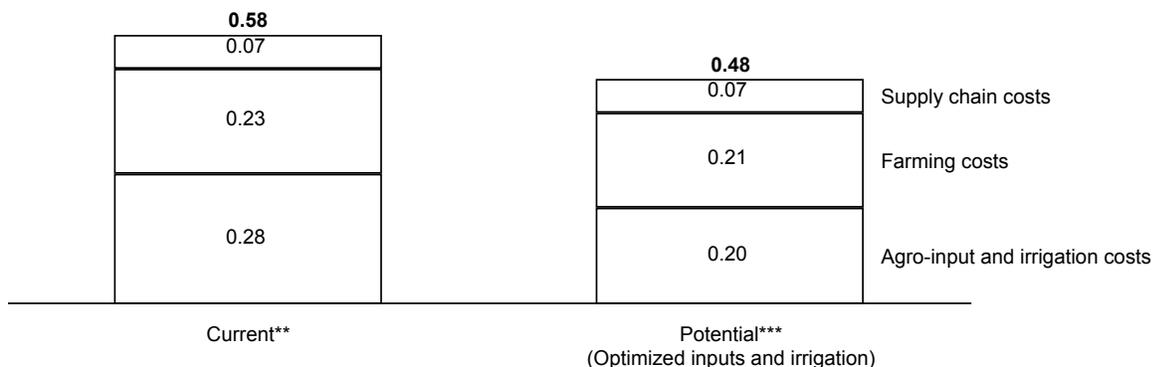
Using fewer but higher quality agro-inputs would save farmers on average \$120 per hectare. In addition, cutting farmers' irrigation rates in half would save farmers \$114 in energy costs per hectare. The combined efficiency savings of \$234 per hectare, on top of a higher yield, would reduce Vietnam's estimated cost of production from current levels of 58 cents to less than 50 cents per pound (see Exhibit 10). These efficiency gains would solidify Vietnam's position as the world's lowest-cost coffee producer.

## Reduced volatility

A major drought in Vietnam would shock global coffee markets. The 2005/6 drought led to unprecedented volatility in Robusta futures markets. Although volatility may produce short-term winners, it is not desirable for planning long-term investments. Both farmers and the wider coffee industry share an interest in minimizing price risk and sudden market fluctuations.

## Exhibit 9 Sustainable farming practices would improve Vietnam's cost advantage

Vietnam cash cost of production\*, current vs. potential  
US\$ per pound green



\* Excludes value of family labor

\*\* Assumes yield of 2.2 tons per hectare and current fertilization and irrigation practices

\*\*\* Assumes yield of 2.4 tons per hectare; fertilizer usage reduced and irrigation levels halved

Source: Kuit Consultancy; Simpatica; Yara; Vinachem; TechnoServe analysis

# A Path Forward

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## **An ambitious training program that can reach all farmers**

There are clear financial returns for farmers who adopt more sustainable practices. (Historically, Vietnamese farmers have been very fast adopters.) Nevertheless, training must catalyze the change to help farmers understand the benefits of optimized agro-input and irrigation practices.

The upfront training investment is considerable, estimated at \$150 per farmer, but yields a return of nearly \$500 in increased net income per farmer after 4-5 years. A program to reach all of the country's smallholders would cost a total of \$70-80 million and take around 10 years. A program focused in Dak Lak, the province that currently has the highest output but is also the most vulnerable to drought, would cost less than \$30 million.

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## **New incentives (and penalties)**

The Vietnamese government can make regulatory changes that would incentivize farmers to adopt more sustainable practices. Doing so could save up to \$60 million in annual fertilizer purchases. Soil testing facilities need to be expanded. State-owned fertilizer companies can improve product quality and offer a wider range of blend formulations. Alternatively, the playing field could be leveled for international fertilizer suppliers to better compete with local companies.

Groundwater levels in the Central Highlands require systematic monitoring. From there, different options exist for incentivizing farmers to reduce their water consumption. Wells could be registered and required to install water meters; fines could be introduced for tampering with water meters and for excessive water usage in drought years. Nonfinancial incentives, such as peer performance benchmarking and targeted communications, could also be effective in curbing over-irrigation.

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## **Co-investment from different actors**

Various actors in addition to farmers should take an interest in more sustainable practices. For donors and the government, returns include higher incomes for farmers, long-term safeguarding of the environment, and improved resilience to climate change. The investment required to train all of the farmers in Vietnam amounts to less than 3% of 2012 export revenues, making it a highly cost-effective use of public resources. For coffee companies, sustainable supply from Vietnam is critical to procurement. The farmer-level work could be financed by the industry for \$5-10 per ton over 10 years – less than it currently spends on annual sustainability verifications.

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## **A collaborative framework to support implementation**

The coffee supply chain is not prepared to start this work tomorrow. Economies of scale are necessary to achieve the above cost structures. The best practices for farmers to implement and the best approaches for reaching them are not readily available “off the shelf”. Consistent monitoring and evaluation methods are needed so that impact can be established transparently and benchmarked across different initiatives.

These components require collaboration upfront, but build a foundation for successful implementation later on. The Sustainable Coffee Program is investing in a collaborative framework among stakeholders in Vietnam and the international coffee industry to embark on this path forward.

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# Acknowledgements

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## Key sources

*Institutions:* 4C Association; Armajaro; Dak Man; Ecom; EDE Consulting; Hans R. Neumann Stiftung (HRNS); Institute for Policy and Strategy for Rural Development (IPSARD); Nedcoffee; Olam; Rainforest Alliance; Simexco; SNV; Trung Nguyen; UTZ Certified; Vicofa; Vinacafe; Volcafe; Western Highlands Agriculture and Forestry Science Institute (WASI); Yara.

*Data:* Dak Lak Statistical Department; Ministry of Agriculture and Rural Development (MARD); International Coffee Organisation (ICO); Food and Agriculture Organization of the United Nations (FAO); International Center for Tropical Agriculture (CIAT); Simpatica; Tropical Commodity Coalition (TCC); United States Department of Agriculture (USDA); Vinachem; World Bank.

*Publications:* Ahmad 2000; Cheesman et al. 2007; D’Haeze et al. 2003 & 2004; Fontenelle et al. 2007; Lu 2002; Marsh 2007; Trieu 2005.

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## About The Sustainable Trade Initiative

The Sustainable Trade Initiative (IDH) accelerates and up-scales sustainable trade by building impact oriented coalitions of front running multinationals, civil society organizations, governments and other stakeholders. Through convening public and private interests, strengths and knowledge, IDH programs help create shared value for all partners. This will help make sustainability the new norm and will deliver impact on the Millennium Development goals.

The Sustainable Coffee Program (SCP) is a mainstream public/private consortium supported by IDH, major coffee industry representatives, trade and export partners, civil society organizations, governments and standard setting organizations.

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## About TechnoServe

TechnoServe is a non-profit organization that works with enterprising people in the developing world to build competitive farms, businesses and industries. TechnoServe develops business solutions to poverty by linking people to information, capital and markets. Our work is rooted in the idea that hardworking people can generate income, jobs and wealth for their families and communities. With more than four decades of proven results, we believe in the power of private enterprise to transform lives.

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