

# Realizing a New Vision for Agriculture:

## A roadmap for stakeholders



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# Preface

The World Economic Forum is pleased to present this roadmap for realizing a New Vision for Agriculture, which is the outcome of an 18-month process that engaged global and regional stakeholders around the world.

The World Economic Forum's New Vision for Agriculture initiative is led by 17 global companies that are Industry Partners of the Forum. The initiative addresses the major challenges of global food and agricultural sustainability based on a vision of agriculture as a positive contributor to food security, environmental sustainability and economic opportunity. To advance progress toward that vision, this roadmap outlines a framework for action to implement business-led and market-based solutions that are explicitly linked to national development priorities.

Over the past 18 months, the initiative has outlined its vision and worked intensively with global and regional stakeholders to identify priorities for action and opportunities for collaboration. Through leadership-level brainstorming sessions in Tanzania, Vietnam, India, the United States and Switzerland, the initiative engaged over 350 leaders of business, government, civil society, international organizations and academia. In the process, it catalysed two country-level partnerships in Tanzania and Vietnam to put its ideas into action. These and other innovative models of collaboration will be discussed by global leaders at the World Economic Forum Annual Meeting 2011 in Davos-Klosters, Switzerland.

Many partners and constituents contributed to the roadmap. The 17 global companies that championed the initiative are Archer Daniels Midland, BASF, Bunge, Cargill, The Coca-Cola Company, DuPont, General Mills, Kraft Foods, Metro, Monsanto Company, Nestlé, PepsiCo, SABMiller, Syngenta, Unilever, Wal-Mart Stores and Yara International. They contributed tremendous leadership and technical expertise through a project board and working group, whose members are listed in the Annex.

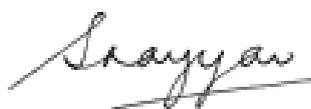
McKinsey & Company served as project adviser for the initiative, contributing substantial time and analysis through a dedicated team of experts. The International Food Policy Research Institute served as a knowledge partner, providing expertise to global and regional discussions. The World Economic Forum's Global Agenda Council on Food Security, a high-level multistakeholder group, served in an advisory role.

Eight members of the Schwab Foundation for Social Entrepreneurship also provided input. A number of academic and institutional experts provided input and review. Farmer leaders participated in each of the regional leadership dialogues, providing key insights and recommendations that shaped this roadmap. These contributors are also listed in the Annex.

This roadmap carries a key message that the private sector is ready to be a partner and driver of solutions for sustainable agriculture. However, the private sector cannot accomplish these goals alone. Partnership among stakeholders, and effective government leadership in particular, is critical to success. We hope this roadmap will encourage many others to initiate action or collaborative efforts to achieve our shared goals for a sustainable future.



**Robert Greenhill**  
Managing Director  
World Economic Forum



**Sarita Nayyar**  
Senior Director, Consumer Industries  
World Economic Forum USA

# Executive Summary

## The World Needs a New Vision for Agriculture

**Agriculture provides much more than food.** It offers essential commodities, environmental services and social goods that facilitate economic development, industrialization and diversification. From its inception, the purpose of agriculture has been to feed and fuel human activity. And now, it is more important than ever.

**The world must produce more with less.** The sector is entering a new era, marked by scarcer resources, greater demand and higher risks of volatility. Since agriculture accounts for 70% of water use and up to 30% of greenhouse gas emissions, it contributes to and is threatened by environmental degradation. This will be exacerbated as the growing population demands more food – nearly double today’s levels by 2050 – and more resource-intensive produce such as meat and dairy.

**Agriculture can better fulfil the world’s most basic social needs.** Nearly 1 billion people go hungry today – half of them farmers – and malnutrition severely impedes human and economic development. Three-quarters of the poor live in rural areas, most relying on agriculture for their livelihood. In many regions, women contribute the bulk of farm labour. Farmers can be among the greatest beneficiaries of agricultural development and are at the core of the solution.

## The Time to Act Is Now: Committing to 20/20/20

The New Vision for Agriculture strives to harness the power of agriculture to drive food security, environmental sustainability and economic opportunity. Its aspirations are high, not least of which are to increase production by 20% while decreasing emissions by 20% and reducing the prevalence of rural poverty by 20% every decade.

These goals are intended to build on the Millennium Development Goals and other international targets by coordinating and concentrating the efforts of agricultural players around the world.



**We must act together with scale and speed.** Market-based approaches are essential to implementing viable solutions, as is collaboration among farmers, private industry, governments and civil society. The challenge is enormous, but the opportunity is both substantial and achievable.

## Innovative Tools Can Break Bottlenecks in the Value Chain

**Constraints can be found at every stage of the agricultural chain, from research to consumption.** While common problems affect agriculture in many countries, such as inadequate access to inputs, finance and storage, the most effective solutions to breaking these bottlenecks vary between regions and systems.

**Agriculture is and must continue to be innovation-driven.** Many players have developed highly effective point interventions to address bottlenecks in the value chain, improving input technologies and farmer capabilities, for example. The technical know-how of global institutions must be combined with the resourceful acumen of local entrepreneurs to inspire new breakthroughs. Achieving the New Vision requires a greater number of these successes, adopted quickly at scale.

## Sparking a Virtuous Cycle of Increasing Skill and Investment

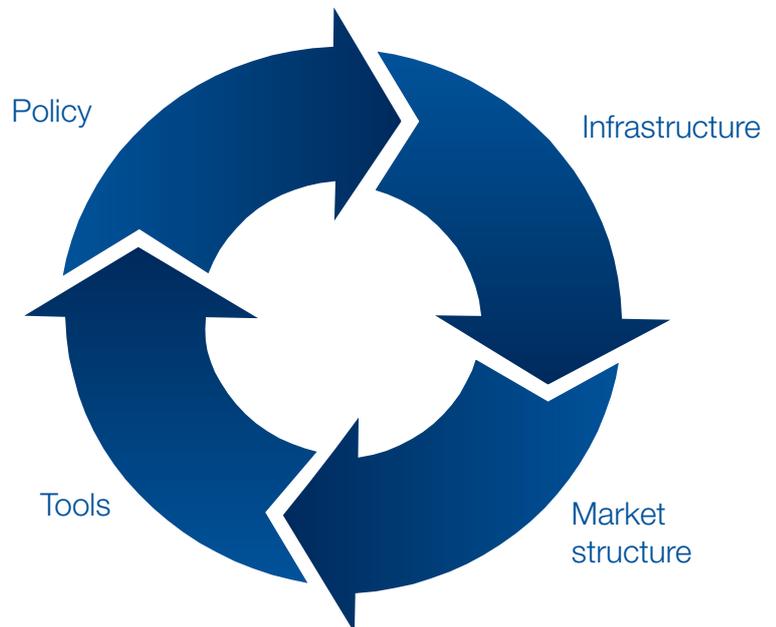
Realizing agriculture's full potential as a driver of food security, environmental sustainability and economic opportunity requires **fundamentally shifting the way the system operates**.

Innovative tools only work if they are supported by the right policy, infrastructure and market structure. Improved seed does not yield a full harvest without soil management and storage; an improved harvest can result in price erosion and regional surplus without appropriate market links.

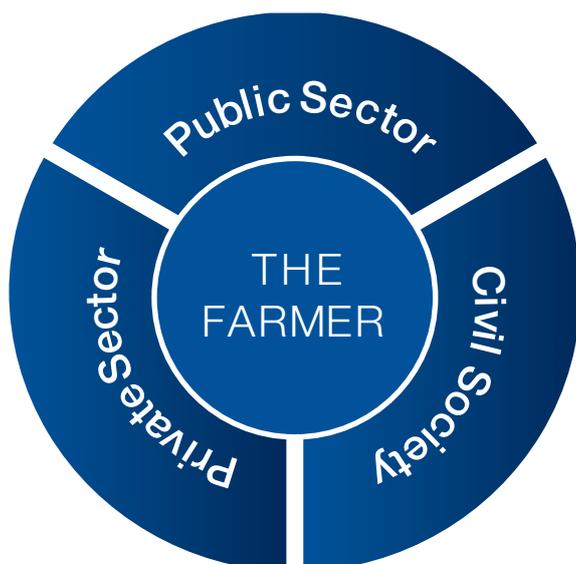
### A New Generation of Agricultural Initiatives

In a few places, governments, businesses and civil society are spearheading these virtuous cycles by orchestrating and accelerating investments to change agricultural systems holistically. Many such approaches are in the early stages, but have the potential to transform even the most challenged geographies.

**Examples of robust collaboration concentrate on a particular crop or geographic region**, such as value chain interventions, infrastructure corridors, breadbaskets and national sector transformations. By coordinating their efforts, stakeholders can mitigate risk, leverage their contributions and build on each other's competencies to harness market forces for sustainable growth.



### Every Stakeholder Has a Critical Role



**The scale of the challenge will require everyone to step up their efforts.** Governments must lead, setting the direction for their country's transformation and creating the right environment to achieve it.

Businesses drive implementation through innovation, investment and competition. Civil society mobilizes and supports communities, manages risk, builds local capacity and bridges gaps not addressed by the market.

**The companies leading this initiative commit to realizing the new vision for agriculture.**

But they cannot do it alone. What will you do?

# Agriculture Matters



30%

**Proportion of greenhouse gas emissions** related to agriculture  
(16% from forestry)

40%

Share of **worldwide employment**  
in agriculture (including 70% of  
the “bottom billion”)

70%

Share of **worldwide water withdrawals** from agriculture

10,000

Years of historical **food production**  
that must be matched in  
the next 50 years

925,000,000

Hungry people today

# The Need for a New Vision

Society is critically dependent on agriculture. It is the foundation of the food chain and provides 40% of the world’s jobs. From its inception, the purpose of agriculture has been to feed and fuel human activity. Driven by innovation and investment, agricultural productivity has increased substantially. Almost 5 billion people have enough to eat today, up from only 2 billion half a century ago; in that same period, farmers in some parts of the world have doubled their resource efficiency. These successes have underpinned unprecedented growth and supported the development of modern society. But agriculture is entering a new era marked by scarcer resources, greater demand and potentially higher price and supply volatility.

Going forward, the world must produce far more with less.

## Constrained Environmental Resources

Agricultural growth, although commendable, is placing increasing stress on the earth’s resources. The sector contributes to and is threatened by environmental degradation and climate change. Agriculture accounts for 70% of water withdrawals and up to 30% of greenhouse gas emissions (including 16% from deforestation).

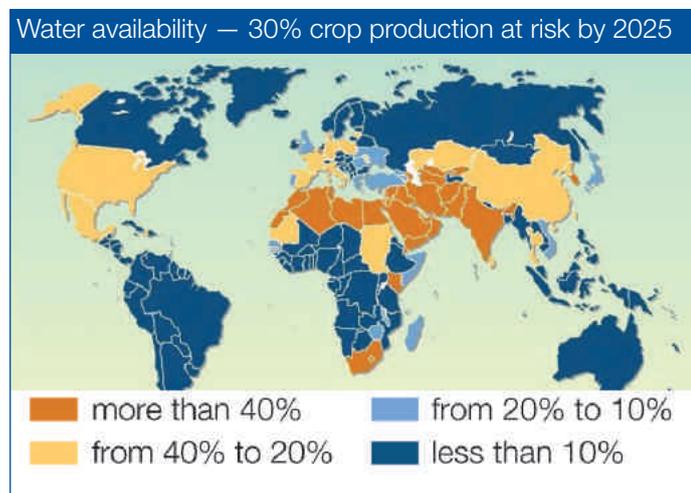
In recent decades, poor agricultural practices have been a factor in the depletion of soil fertility, species diversity and water availability and quality. Meanwhile, broader environmental changes are affecting agriculture in ways yet to be fully understood. Alterations in climate mean that farmers must adapt to changing rainfall patterns and fluctuations in temperature; yields could be reduced by more than 20% in many areas, with poor countries – and poor farmers – facing particularly severe outcomes.

## Growing Demand

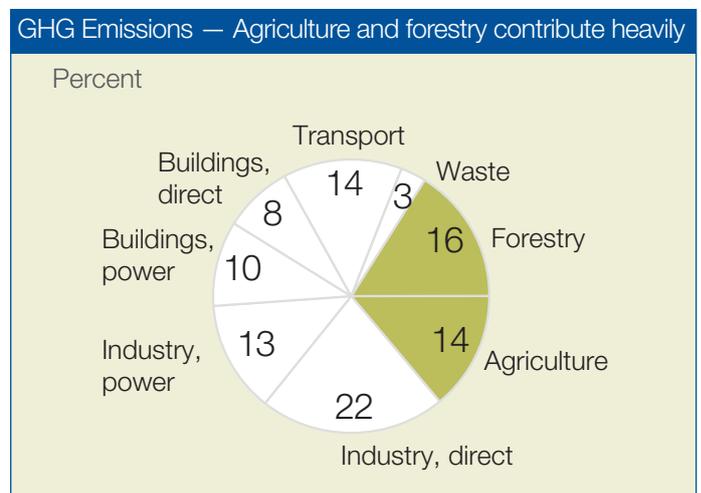
Agriculture faces the dual challenge of becoming more environmentally sustainable while feeding more people. In the next 40 years, the global population is expected to increase by one-third, peaking at over 9 billion. The intensity of consumption is growing even faster; as incomes rise in emerging markets, new members of the middle class demand more meat and dairy, which require more resources to produce.

Experts project that annual meat production will need to rise by 75% – to 470 million tonnes – by 2050. Societies will be forced to make difficult trade-offs in allocating resources. Riots over the last few years remind us that food uncertainty can rapidly undermine basic stability.

With 70% of the world’s population expected to live in cities by 2050, the need for effective food distribution – linking growers to retailers to consumers – will intensify. Urban populations demand more processed and ready-to-eat food, as well as more diverse options. This will increase the role of processing, packaging and logistics providers in food systems.

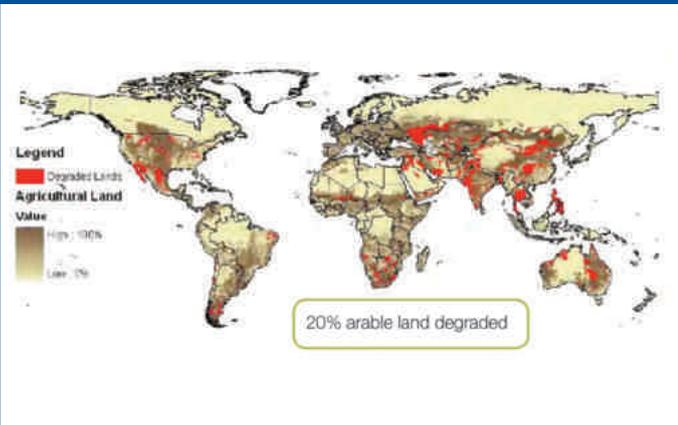


Source: UNEP



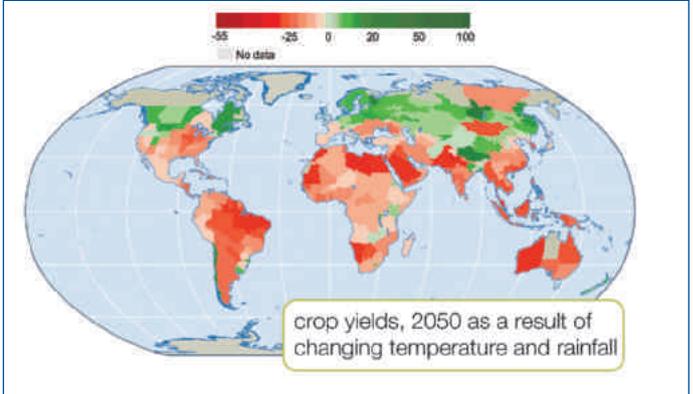
Source: IEA

### Soil — Poor soil health threatens yields



Source: SAGE

### Climate change — yields potentially depressed 20%+ in many areas



Source: World Bank

## Basic Social Needs

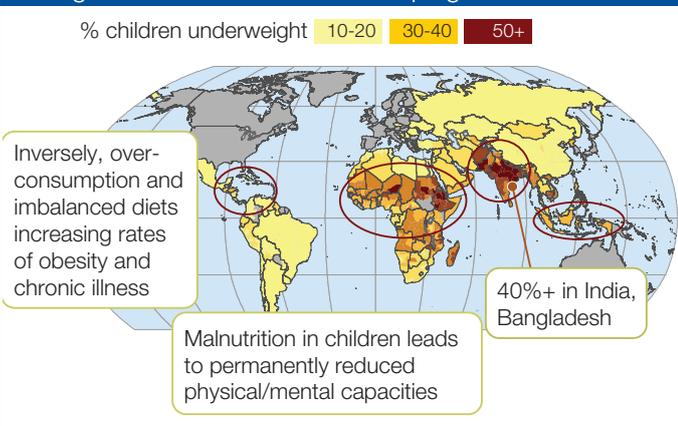
Agriculture is a principal platform for human development and social welfare. It is the foundation upon which diverse economies have been built and provides a pathway out of poverty for millions.

Agricultural development is an opportunity to better meet these basic needs. Nearly 1 billion people are hungry today – half of them farmers. Three-quarters of the poor in developing countries live in rural areas – over 2 billion people get by on less than US\$ 2 a day.

*“If we are serious about ending extreme hunger and poverty around the world, we must be serious about transforming agriculture.”*  
**William H. Gates**  
 Co-Chair, Bill & Melinda Gates Foundation

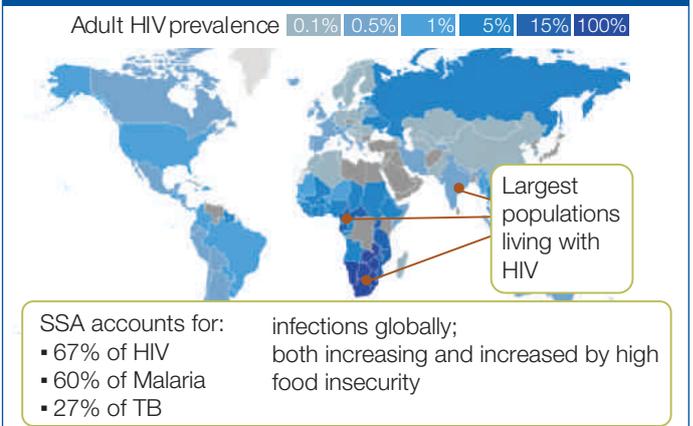
These issues are inextricably linked, particularly in developing countries, where the poor spend a high proportion of their income on food. Poverty usually leads to malnutrition, causing physiological and cognitive damage, depleting capital, increasing vulnerability and diminishing productivity at both the individual and national levels. Child malnutrition is particularly detrimental, as many of the health impacts incurred between conception and two years of age are irreversible.

### Undernutrition — Linked to one-third of all deaths amongst children under 5 in developing world



Source: CIESIN

### Healthcare — Both production and consumption decline when illness strikes rural households



Source: UNAIDS/WHO

## Poverty



low productivity and lack of capital

## hunger and malnutrition

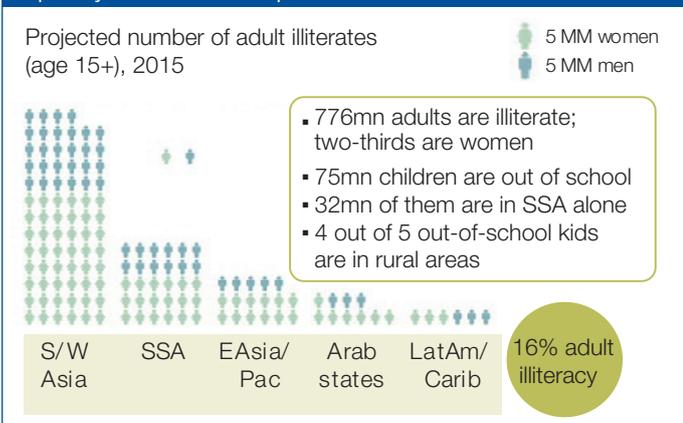


physical and cognitive underdevelopment

These cross-cutting issues form vicious cycles of deprivation, particularly in rural areas. They are often aggravated by the absence of basic services such as healthcare and education, further impeding the potential for human development.

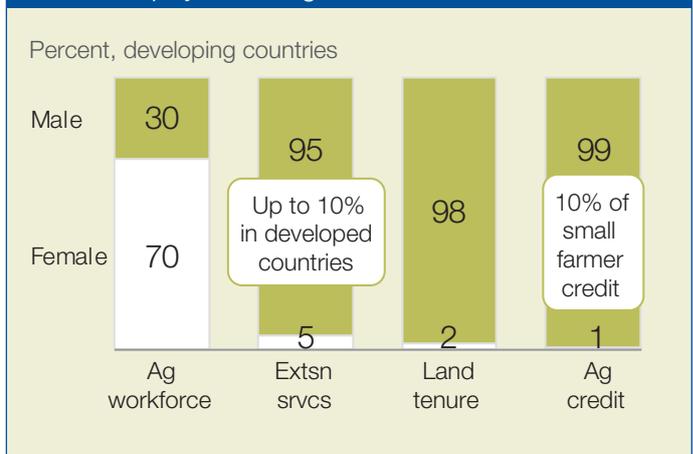
These issues pose particularly severe challenges for women, who in many regions have both the greatest responsibility and the fewest resources by which to ensure food security for their communities. Limited access to land, finance and training together with cultural factors constrain women's ability to produce and deliver adequate nutrition for their families.

### Education — Lowering productivity, earning potential, capacity of rural development



Source: UNESCO EFA

### Gender inequity — Driving resource misallocation



Source: Bill and Melinda Gates Foundation

## Rethinking Agriculture

Underdevelopment in rural areas pushes individuals to follow economic opportunity into the city, leaving the most vulnerable behind. Agricultural development can mitigate this trend by cultivating rural opportunity and more inclusive societal growth.

Given the stakes, the world must deliver on agriculture's full potential. The approaches of the past simply cannot meet the challenges ahead. Building on successes, we must proactively factor in the cost of natural resources, the need to boost production in developing countries and ways to provide hungry people with basic nutrition. This will be one of the greatest challenges of our generation.

The time has come for a New Vision for Agriculture.

	Yesterday's approaches...		... will not be sufficient tomorrow
Resource utilization	Convert potential arable land to cropland		Diminishing land availability, soil degradation, high environmental cost
	Rapid scaling of irrigated land area, overdraw on groundwater		Depleted ground water stores render urgent water efficiency measures
	Agriculture's environmental impact accepted or ignored		Environmental sustainability as necessary stipulation
Productivity growth	Reliance on increased yields in developed countries		Yield growth in developing countries vital to meet global demand
	Acceptance of low smallholder productivity		Smallholder improvements critical to address global hunger and poverty
Scope improvement	Priority on calories and increasing cereal production		Importance of crop diversity, nutritional content and food affordability
	Focus on farm-level output and yield		Efficiency in whole value chain necessary for access, food security

## Farmers at the Forefront

### Efrén Rizo, Nicaragua

In the impoverished province of Jinotega, more than 80% of the population earns less than US\$ 1 a day.

The 22 vegetable farmers who comprise the Tomatoya-Chagüite Grande cooperative were once stuck in this cycle of extreme poverty. Efrén Rizo, the cooperative's president, and his family often suffered from hunger because of their low income.

Tomatoya-Chagüite Grande worked with TechnoServe to improve the quality of their harvest and secure supply orders from leading supermarkets.

They now sell directly to Nicaragua's largest supermarket chain, earning 10 times their previous income. Today, Rizo earns enough to provide his children with the education he never received.

Source: TechnoServe



### Suzanne Tsovalae, Madagascar

Suzanne Tsovalae, 23 years old, is a farmer in the Tanandava village. She supports her family by growing sweet potatoes and beans, raising small livestock, and buying and selling fish and prickly pear in the regional market.

Tsovalae's livelihood is dependent on the harvest, which is dependent on the rain. She has not heard of climate change (news only transmits from a few local radios) but recognizes that increasingly volatile floods and droughts are forcing villagers to go hungry or migrate. She believes she will always be a farmer, but says, "I will do my utmost in commerce not to fall into poverty." She has never received training and uses very rudimentary farming practices. Her basic education allows her to read and use currency at the market. Without access to a bank and hesitant to keep cash, she "stores" money by accumulating chickens.

She feels her life has been steadily improving, and credits her initiative in small commerce. She has to walk great distances to trade, though, and would like to see a marketplace in her village that will bring produce, vehicles and news. She hopes to save money to buy cattle so she may put her children through school.

Source: IFAD, PANOS



### Clay Mitchell, United States

Clay Mitchell and his father Wade operate a fifth generation, 1,000 hectare, non-irrigated corn and soybean farm in the state of Iowa. A leader in no-till techniques and novel agronomic systems, the Mitchell Farm is best known for the applying automation and GPS data to achieve large savings in seed, fertilizer and chemical use (10%, 10% and 20%, respectively) while consistently delivering high yields.

In this region, significant gains in farm productivity and long-term farm value will come through soil maintenance and improvement. In Iowa, near-perfect growing conditions have become more variable after a history of intensive tillage has reduced overall soil organic matter by 50% and moved remaining soil around within fields.

Perhaps the most important innovation from the Mitchell Farm to agriculture's future is the use of large-scale yet intricately precise earthmovers that automatically cut and fill soil to restore the full productivity of land and reverse the effects of an erosion process that was previously considered irreversible.

Source: Mitchell Farm

# The Goals of the New Vision

Agriculture can be a positive driver of food security, environmental sustainability and economic opportunity. It is the only sectoral investment that addresses these three pressing issues simultaneously. Each part of this Vision is vital to the long-term viability and success of agriculture.

What do we *envision* with this New Vision? Consider the following: as a farmer, you feed your family and the wider community. You produce enough to earn a living without compromising the ecosystem. You have the knowledge to make better decisions about what to grow and how to grow it. Your produce reaches consumers, who can make informed choices for a healthy diet. The obesity epidemic is curbed and mass hunger is eliminated. Clean water is available when and where it is needed; we

continue to rely on biodiversity for daily and future needs. People along the agricultural value chain can pursue livelihoods and create jobs – not just on farms, but in industry, business and services. Men and women are motivated and rewarded for inventions that improve their food system and living standards. Rural parents can raise their children to lead fulfilling and healthy lives.

To help realize these aspirations, the New Vision is anchored to three core goals. These build on the foundation of the Millennium Development Goals and other international targets by coordinating and concentrating the efforts of agricultural players around the world.

## Provide food security for all ...

*Meet nutritional demands while providing affordable choices across the food value chain*

- Increase agricultural production by 20% each decade and substantially reduce waste, towards the elimination of hunger and undernourishment

Achieving food security requires more than increasing production – although sufficient supply is necessary. Building this pillar of the New Vision will require improvements across the supply chain to close yield gaps, promote efficient distribution, minimize waste and improve food access.

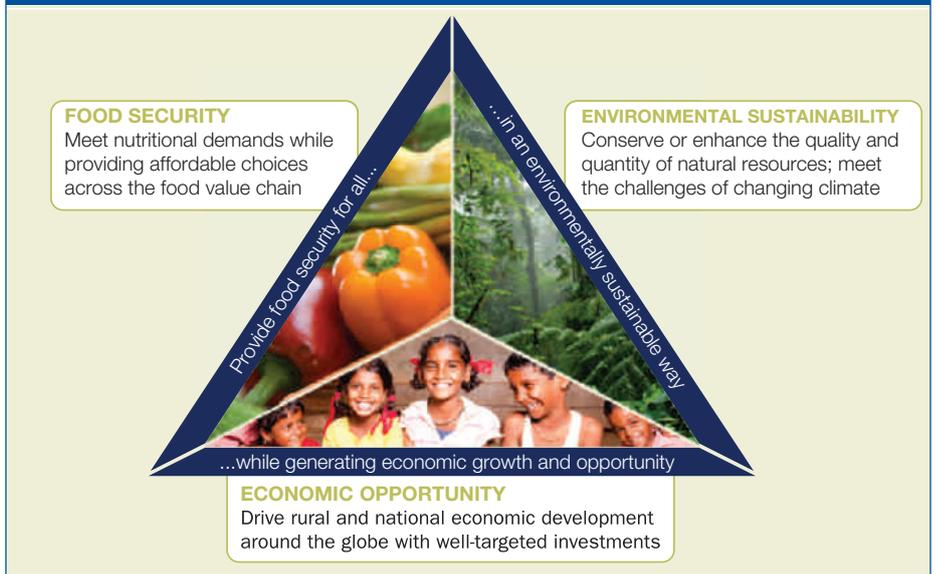
It will also involve focused efforts to engage the most vulnerable and bring them into the broader agriculture system. Consumers will have to be educated to make the best choices and minimize spoilage and waste. A critical focal point is maternal and child health, as this is a proven axis for a community's broader nutritional status.

## ... in an environmentally sustainable way ...

*Conserve or enhance the quality and quantity of natural resources; meet the challenges of a changing climate*

- Reduce emissions per tonne of production by 20% each decade; optimize overall water use; lessen agricultural impact on the environment

A global agriculture system that harnesses the power of markets and multi-stakeholder collaboration to feed the world, protect our planet and create prosperity



## Supporting Nutritional Security

Proper nutrition is essential for human development and productivity. Ensuring proper nutrition requires robust agriculture systems globally, as well as appropriate awareness and decision-making locally.

Nutritious food must first be available. This involves balancing crop choices (e.g. vegetables), as well as appropriate varieties (e.g. biofortification) to meet protein, caloric and micro-nutrient requirements.

Nutritious food must also be affordable to enable equitable access. This entails both improving consumers' incomes and lowering costs through supply chain efficiencies and product design.

Finally, consumers must choose and absorb healthy nutrition. This can be furthered by delivering evidence-based and locally-appropriate options (e.g. supplementation, , diverse menus), raising community awareness and promoting healthy practices such as breast-feeding and proper sanitation.

An emerging area of focus is the interaction between agriculture, nutrition and health. While historically managed as separate sectors, these are increasingly recognized as closely interlinked parts of a larger chain, in which agriculture serves as a driver of human health through its delivery of nutritional needs. This requires a broader framework for managing health – including both over- and under-nutrition – within the context of a sustainable food system.

Agricultural production need not be a detriment to the planet; in fact, it can be a linchpin of sustainability. It provides vital ecosystem services such as watershed management and carbon sequestration that offset industrial growth.

The New Vision strives for an absolute minimization of the environmental footprint, beginning with reductions in its impact relative to production. This includes limiting greenhouse gas emissions and water consumption while preserving soil health and biodiversity. It necessitates judicious use of technologies, monocultures and cropland expansion.

It will also require technological breakthroughs to help farmers adapt to the consequences of climate change, enable production and mitigate risk under increasingly difficult conditions.

**... while generating economic growth and opportunity.**

*Drive rural and national economic development around the globe with well-targeted investments*

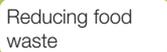
- Decrease the proportion of rural inhabitants living on less than US\$ 1.25/day by 20% each decade

Agriculture is the predominant driver of growth in many low- and middle-income countries, and GDP growth from agriculture has proven to be more effective at reducing poverty than growth originating in other sectors. Investing in the success of rural populations is vital to equitable human development. This involves targeting those below the poverty line and enabling the growth of rural economies with widespread access to transport, energy and information.

Farmers who earn can spend, supporting jobs and incomes for local businesses and service providers. Thriving local communities can invest more in education and healthcare, propelling productivity.

Reaching the central goals of the New Vision will require contributions from every stakeholder of global agriculture: developed and developing countries, exporters and importers, large-scale producers and subsistence growers. Farmers will need to be engaged and empowered in every system. Large commercial players are critical to stabilizing global supply and can apply sustainable practices at scale. Smallholders, who currently lack access to critical inputs and markets, will be vital to meeting local nutritional and economic needs. Pursuing the New Vision's three objectives simultaneously will inevitably require careful societal choices and tradeoffs.

**Achieving these goals will require contributions from every aspect of global agriculture and conscientious navigation of difficult societal tradeoff**

Changes required	Example tradeoffs	Potential impact		
		Food security	Economic development	Environmental sustainability
 <p>Smallholder green revolution</p>	<p>Farming as a livelihood</p> <p>↕</p> <p>Farming as a business</p>	<ul style="list-style-type: none"> <li>▪ Potentially accounts for <b>40-50%</b> of output increase to 2030</li> </ul>	<ul style="list-style-type: none"> <li>▪ Represents 90% of farms worldwide, lifting greatest number of people out of poverty</li> </ul>	<ul style="list-style-type: none"> <li>▪ Increased productivity will reduce pressure on forest land</li> </ul>
 <p>Robust commercial agriculture</p>	<p>Need for foreign investment</p> <p>↕</p> <p>Fear of land grabs and technology</p>	<ul style="list-style-type: none"> <li>▪ Potentially accounts for <b>40-50%</b> of output increase to 2030</li> </ul>	<ul style="list-style-type: none"> <li>▪ Contribution to exports, higher-value processing, and active international trade</li> </ul>	<ul style="list-style-type: none"> <li>▪ Opportunity to implement improved irrigation and fertilizer practices at scale</li> </ul>
 <p>Responsible land expansion</p>	<p>Demand for land for crops/livestock</p> <p>↕</p> <p>Preservation of delicate ecosystems</p>	<ul style="list-style-type: none"> <li>▪ Potentially accounts for <b>15-20%</b> of output increase to 2030</li> </ul>	<ul style="list-style-type: none"> <li>▪ Potential catalyst for development of isolated regions</li> </ul>	<ul style="list-style-type: none"> <li>▪ Conflicts with other land uses: forestry, REDD, biofuels, etc</li> </ul>
 <p>Reducing food waste</p>	<p>↑</p>	<ul style="list-style-type: none"> <li>▪ More food available where needed</li> </ul>	<ul style="list-style-type: none"> <li>▪ Land and earnings freed for other uses</li> </ul>	<ul style="list-style-type: none"> <li>▪ Environmental footprint reduced</li> </ul>

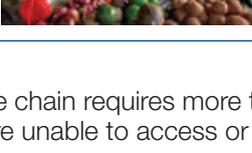
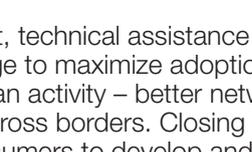
NOTE: Food production estimates based on FAPRI demand forecasts for 2020 and 2030, with productivity forecast to increase by 20-30% in commercial agriculture in developed countries and 30-50% in smallholder agriculture, plus 5-10% of available land brought into production

## Critical Path Interventions

Given the complexity of the agricultural system, progress is no simple matter. Technical challenges and market failures arise at every stage of the value chain.

Agriculture will require the continued invention and dissemination of “point interventions” to improve specific parts of each system. Agriculture is and must continue to be innovation-driven: Norman Borlaug’s work on rust-resistant wheat brought food security to Mexico, while the tools developed by EMBRAPA transformed the Brazilian *Cerrado* into a breadbasket. These breakthroughs applied global scientific and technical innovation through the resourceful insight and acumen of local entrepreneurs. Achieving the New Vision requires more of these successes at a large scale, with proactive attention towards the health of people and this planet.

### Significant issues exist at every stage of the value chain

Stages	Specific issues at each stage
 Research & Development	<ul style="list-style-type: none"> <li>Orphan crops</li> <li>Specific soil/ climate adaptations</li> <li>Major crop and livestock breeding</li> </ul>
 Input distribution and adoption	<ul style="list-style-type: none"> <li>Financial risk for farmers</li> <li>Insufficient credit</li> <li>Inadequate distribution channels</li> <li>Poorly functioning regulatory systems</li> </ul>
 Farming	<ul style="list-style-type: none"> <li>Best practices not understood/adopted</li> <li>Degraded soil health/ fertility</li> <li>Threats from disease, pests, climate</li> <li>Greenhouse gas emissions</li> </ul>
 Trading and processing	<ul style="list-style-type: none"> <li>Poor post-harvest management</li> <li>Lack of operating capital</li> <li>Lack of local storage and processing</li> </ul>
 Manufacturing and retailing	<ul style="list-style-type: none"> <li>High price volatility</li> <li>Lack of market linkages or demand sinks</li> <li>Poor quality and safety standards</li> </ul>
 Consumer table	<ul style="list-style-type: none"> <li>Food share of household expenditure</li> <li>Poor nutrition awareness</li> <li>Understanding of sustainable production</li> <li>Food waste in developed countries</li> </ul>

But overcoming constraints along the value chain requires more than technical capacity. It requires better dissemination of tools and knowledge. Too many farmers are unable to access or effectively use proven technologies and practices.

The methodology for product development, technical assistance and extension must be broadened: emphasizing affordability and harnessing local knowledge to maximize adoption. Furthermore, to ensure that increased production meets its goals – feeding and fuelling human activity – better networks must be developed for processing, trading and distributing food, both domestically and across borders. Closing these gaps will require new incentives and funding for researchers, companies, farmers and consumers to develop and enact the right solutions – for themselves and the planet.

### Stakeholders are already engaging on many interventions

Stages	Specific interventions in the value chain
 Research & Development	<ul style="list-style-type: none"> <li>High yield, stress-tolerant input</li> <li>Bottom of the pyramid designs</li> <li>Local varieties/adaptations</li> </ul>
 Input distribution and adoption	<ul style="list-style-type: none"> <li>Agri-dealer networks</li> <li>Product bundling</li> <li>Risk mitigation in purchasing</li> </ul>
 Farming	<ul style="list-style-type: none"> <li>Contract/nucleus farms</li> <li>Crop selection optimization</li> <li>Water efficiency</li> <li>Soil/emissions management</li> </ul>
 Trading and processing	<ul style="list-style-type: none"> <li>Trading businesses</li> <li>Local storage facilities</li> <li>Processing plants</li> <li>Prudent food aid procurement</li> </ul>
 Manufacturing and retailing	<ul style="list-style-type: none"> <li>Conscientious sourcing</li> <li>Fair trade pricing</li> <li>Local distribution channels</li> </ul>
 Consumer table	<ul style="list-style-type: none"> <li>Fortification</li> <li>Ethical labeling</li> <li>Build consumer awareness on diet diversity/nutrition</li> </ul>

## Innovative tools can break specific bottlenecks along the value chain

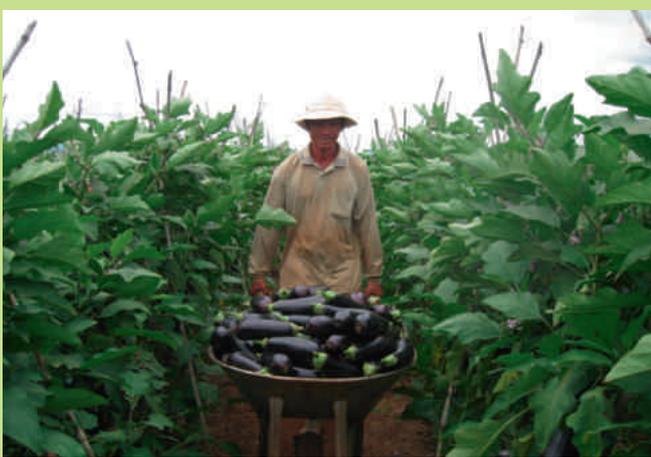
Dwarf wheat, Mexico	High-yield, disease-resistant variety developed by research institutes and adopted at scale across Mexico, transforming it into wheat-secure exporter
BT cotton, India	Insect-protected seed now planted on majority of cotton hectares, significantly boosting both farmer profitability and overall production
Zero-tillage soy cultivation, Argentina	Soil-conserving and emission-reducing process championed by researchers and farmers that cultivates soy in narrow trenches rather than tilled soil and retains biomatter on field
Pradan, India	Technical livelihood training (farm and off-farm) and socio-behavioral skill-building with rural womens' organizations in poorest regions
Rentable solar energy, Brazil	Home electricity systems leased monthly by Sistemas de Tecnologia Adequada Agroeletrô to rural households off the electricity grid, drastically increasing rural incomes and reducing fossil fuel use
"Biogesters", China	Farm-based units which convert manure into biogas and provide low-cost energy to rural households, piloted with Nestle suppliers
Mobile banking, Kenya	Safaricom service allows mobile-phone transfer of currency credits, facilitating rural liquidity
Sustainable Beekeeping, Kenya	Advanced hives sold to farmers on a lease-to-own basis along with extension and fair/ immediate payment for harvest from Honey Care Africa, mitigating producer risk and improving quality
E-choupals, India	Private internet kiosks set up by ITC in villages to transmit relevant data on markets, legislation, weather, and prices to local producers
Homestead gardens, Bangladesh	Diversified gardens and nutrition training provided by Helen Keller International to female-headed households in order to address malnutrition, micronutrient deficiencies
Door-to-door retail, India	Hindustan Level Ltd outsources rural distribution to female entrepreneurs who receive products by mail and sell them throughout village
Flour fortification, Egypt	Addition of iron and folic acid to wheat flour to address malnutrition amongst children and the poor, led by GAIN, WFP, and the government

### Effective interventions often build on:

- Links with research institutions
- Community organizations
- Risk-sharing tools
- Telecom
- Targeted regulations
- Local capacity building

SOURCE: GAIN, Center for Management Research, IFPRI, ITC, Monsanto Company, Nestle, Pradan, Richard Ivey School of Business, Safaricom, Unilever

## Farmers at the Forefront



**Dinh Xuan Toan, Vietnam**

Dinh Xuan Toan is a vegetable farmer in the Lam Dong province of Vietnam. He contracts with Metro Cash & Carry to grow and sell high-quality produce for consumer markets.

As a part of this partnership, he receives extension services that inform him about improved practices like year-round cultivation, crop rotation and balanced fertilizer application.

In return, he must comply with growing standards that ensure crop safety and quality. His income is now not only higher, but also more stable. He is investing his profits in a new bamboo greenhouse, packing house and truck as well as repairs to his tractor and family home.

Source: Metro Cash & Carry



**Gurmail Singh, India**

Gurmail Singh has been growing rice in Punjab for 30 years. Until recently, he relied on conventional methods of transplanting, which rely on groundwater. The depth of the water table has dropped from 60 feet below ground to 250 feet, requiring Singh to use a pump with more than twice the power.

Contract farming with PepsiCo, Singh was introduced to the direct seeding technique for rice, allowing him to sow seeds directly in the main field without water at the crop base. He began using this technique on 0.5 hectares and realized water savings of 30-40% in addition to decreased labour and increased yields.

Singh now uses this technique across 15 acres of paddy and has championed its adoption on over 500 acres in his village, increasing environmental sustainability with the powers of partnership and example.

Source: PepsiCo



## Generating a Virtuous Cycle

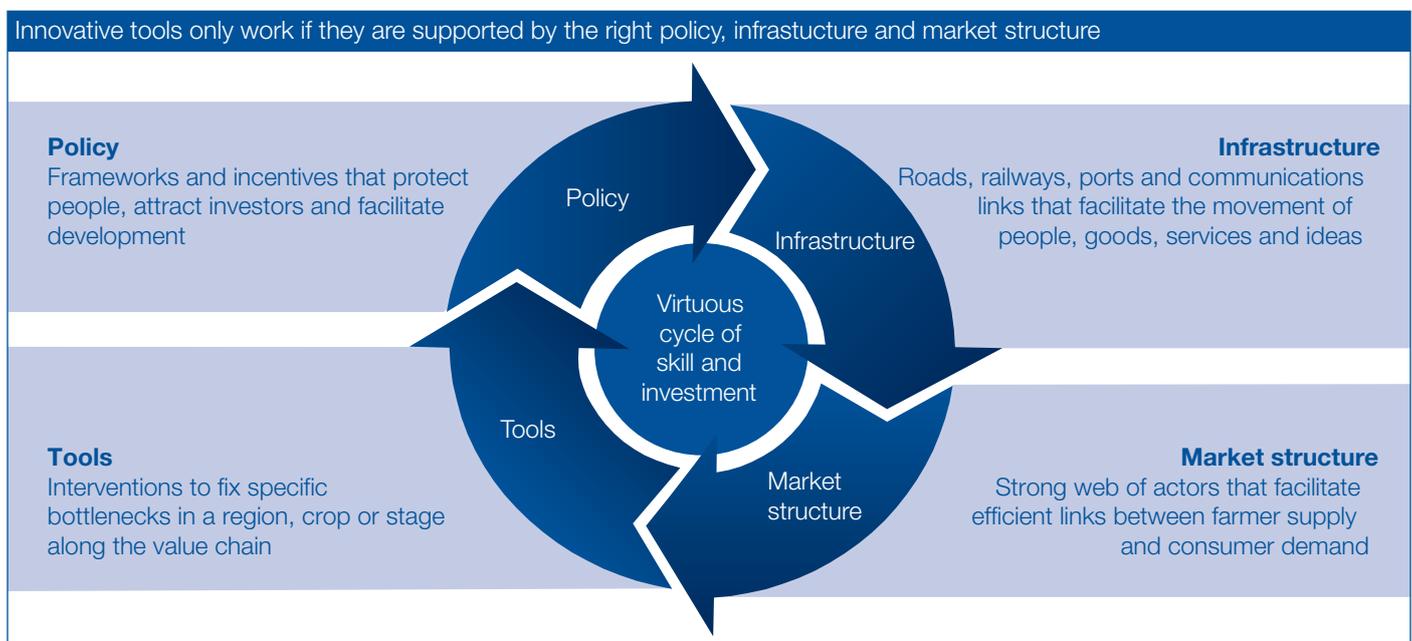
Point interventions are clearly critical, but the impact of each is limited by the weakest link in the value chain. The challenge ahead demands approaches that will fundamentally shift the way the system operates. We need functioning markets in which individual incentives are aligned with the social good prices reflect real costs, and honest work yields a dignified way of life.

Agricultural development can be environmentally, socially and economically viable if approached as a market investment rather than short-term aid. Investors, beginning with farmers, should expect to turn a profit. Only then will they have the incentive to innovate, resilience to endure risk and capital to advance.

When farms succeed as businesses, other enterprises can develop in rural areas: not only selling inputs and buying output, but also processing crops, retailing goods, providing services and sparking trade across villages, borders and oceans. To make this happen, a cycle of skill and investment in agriculture must be sparked.

*“Open markets offer the only realistic hope of pulling billions of people in developing countries out of abject poverty while sustaining prosperity in the industrialized world.”*

**Kofi Annan**  
Secretary-General,  
United Nations (1997-2006)



**Government policy is critical for investment in agriculture.** A framework of regulations should be consistent, transparent and evidence-based and include strict standards of governance, property administration and quality regulation. The policy environment must provide incentives for players to invest in agriculture while protecting the welfare of citizens and the environment. This entails increasing market access while ensuring sufficient public goods (such as research, education and gender equity).

Adapting and adjusting government policy can transform production – as demonstrated in China and Vietnam over the last two decades. In Vietnam, the Doi Moi reforms dismantled collective farms, assigned land rights to farmers and liberalized trade; these policy changes drove GDP growth to 7.6% annually in the 1990s and yielded sharp declines in rural poverty, hunger and malnutrition.

**Robust infrastructure is another base requirement for agricultural development and is critical to a self-sustaining cycle.** This includes roads, electricity, rail, ports, aqueducts, storage and telecommunications to connect interdependent components of the economy. Insufficient infrastructure creates logistical inefficiencies at every stage of production and makes investing – and even interacting – costly.

Strategic infrastructure investments can trigger and support diverse rural economic growth. For instance, the construction of the Erie Canal and proximate railways in the US ignited regional trade: industry boomed in the Northeast, the Midwest became a national breadbasket and productivity rose nationally.

## Village-based Models of Holistic Change

A number of civil society actors have demonstrated the importance of an integrated approach to development.

Institutions such as BRAC and Save the Children and initiatives like the Millennium Villages Project leverage community leadership and target investments to simultaneously improve local health, nutrition, education and incomes.

Many such efforts have had substantial impact at the village or district level and offer useful lessons to public- and private-sector actors who can help adapt and scale such approaches.

**Ensuring a sustainable cycle requires market structures that allow producers to meet consumer needs efficiently.** This entails market links between players along the value chain, financing mechanisms to reduce risk and appropriate scales of supply and demand.

A healthy market structure requires strong actors with the investment capacity to tackle bottlenecks. In some instances, individual players manage this capability, but often it is created through aggregation and cooperation.

For instance, the organization of small coffee producers in Colombia – complete with research, extension and marketing – propelled Colombian coffee to the top of the global market. In India, local dairy farmers formed cooperatives to process and market milk efficiently at scale; the farmer-branded dairy now thrives, mitigating crises of rural poverty and malnutrition.

## Mobilizing Business as an Agent of Change

Given these historical successes and today's need for broad-based action in agriculture, stakeholders are beginning to orchestrate their efforts to spark such virtuous cycles. An initial challenge in developing countries is how to reach and engage millions of smallholders and rural consumers: it is impractical for a single institution to address the varying barriers in every village.

If profit incentives are aligned with the goals of agricultural development and appropriate social safeguards, businesses have the motivation and capability to drive localized change. This applies to family-owned shops as well as multinational corporations.

In many areas today, there are impediments to robust private sector involvement. In addition to ensuring the right policies, infrastructure and market structure, stakeholders may help attract and accelerate private investment. For instance, the government can offer time-bound financial incentives (such as land or tax breaks) to offset start-up costs; foundations can provide seed funding for research and logistics; and NGOs can organize and train producers so they offer a critical mass of talent.

In attracting local businesses, it is critical to consider economic scale and sustainability: forward-looking business models that allow for sufficient ongoing operating profit without long-term dependence on operating subsidies.

Achieving the New Vision requires the private sector to be engaged as an active partner. This includes, but is not limited to, traditional competencies such as technological expertise, financing and sourcing.

It also extends to more proactive roles like private extension, smallholder aggregation (e.g. nucleus farms, warehouses), nutrition education and multistakeholder coordination. In stepping up to lead the transformative process, companies can harness the power of markets to deliver enduring impact.

*“Farming at any scale is a business, and smallholders and producers must be treated as entrepreneurs.”*

**Kanayo Nwanze**

President, International Fund for Agricultural Development (IFAD)

## Who Is the Private Sector?

The private sector includes any individual or institution that earns income by producing and trading goods and services. In the agriculture sector, this spans the range from smallholder farmers to national and multinational companies.

These diverse enterprises are complementary and interdependent. Farmers rely on local businesses to provide inputs, and purchase and process the harvest.

Small and medium-sized enterprises rely on larger firms for technology, manufacturing and retail of consumer products.

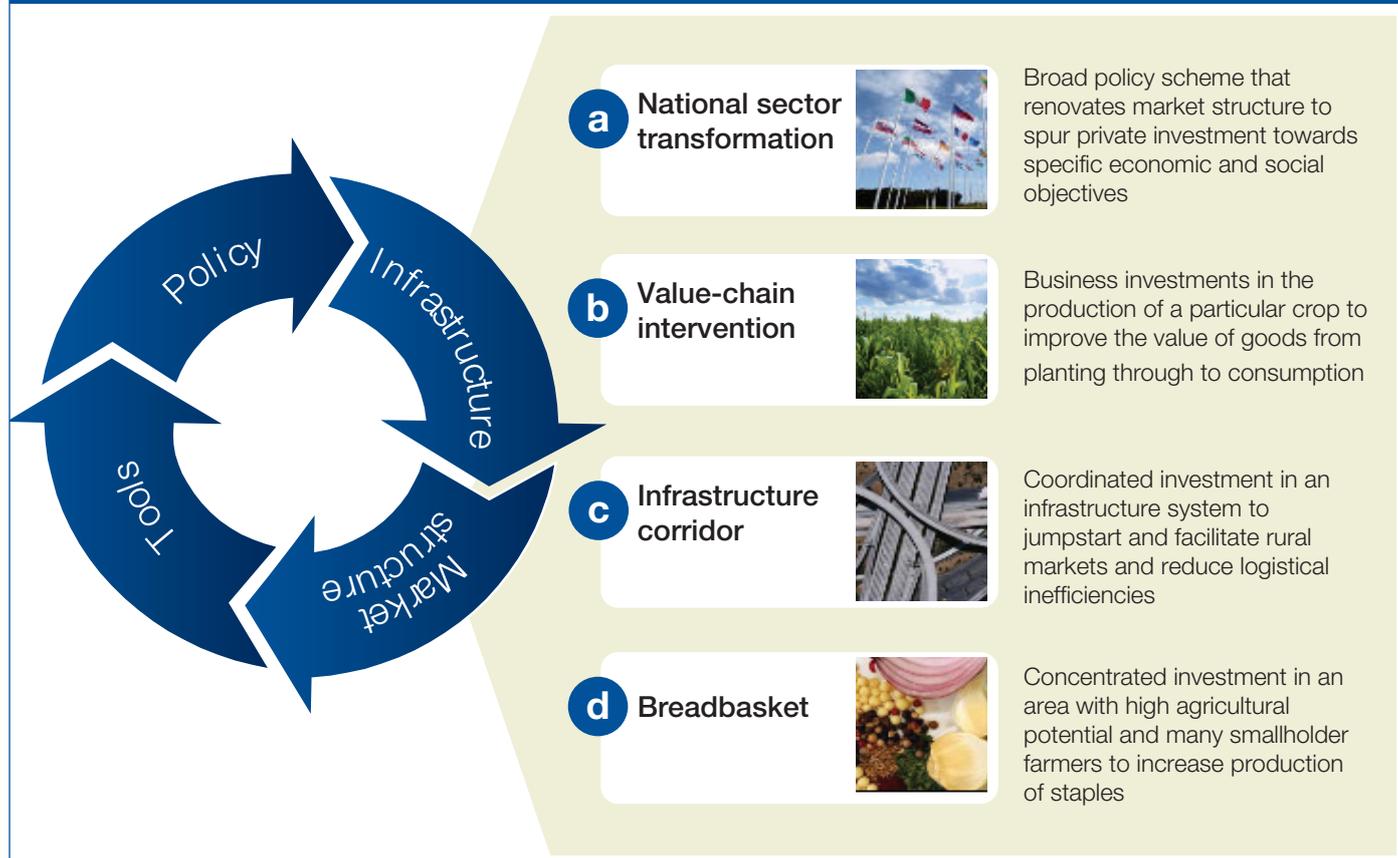
Regional and global companies have the expertise and capacity to help develop markets and deliver impact at scale.

Each has a unique capacity to drive and sustain market-based transformation of the agriculture sector.

## Models of Collaboration

We are witnessing the emergence of a new generation of agricultural initiatives, many in an early stage, which can deliver these transformations in even the most challenged geographies. Private, public and civil actors are using a range of exciting approaches to shape robust markets.

Emerging examples of holistic approaches (not exhaustive):



**a A National-sector Transformation: Green Morocco**



Agriculture accounts for almost 20% of GDP in Morocco and over 40% of jobs but, until recently, productivity had remained stagnant for two decades. To revitalize the sector, create sustainable rural employment and meet growing demand for diverse food choices at

home and abroad, the government developed a strategy to attract private investors while protecting social interests.

The government stimulates high-value crop production to meet national and international consumer demand through “Le Maroc Vert”. Their strategy is to lease land to private investors in return for implementing advanced production, developing value-add facilities, employing rural Moroccans and aggregating the produce of neighbouring smallholders.

In this system, private players invest their resources and know-how for higher-value agriculture, including cash crops, irrigation efficiency and processing. They also link smaller players with the inputs, expertise and consumers they may otherwise not have the scale to reach. A dedicated government agency manages the contracts to attract investors while monitoring to ensure social equity for local communities.

The programme initially identified 700-900 investment projects across the country. The strategy was then incorporated into regional development plans with the aim of reaching 700,000 farmers out of 1.5 million in the first seven years. Through this proactive approach, Morocco is determined to create a million jobs and double agricultural GDP. So far, between 2008 and 2010, the annual income of participating smallholders has tripled to US\$ 3,000, and agricultural GDP has increased by 30%.

**b A Value-chain Intervention: Horticulture in Honduras**

Holistic value-chain interventions in Central America and around the world tackle obstacles from local production to international trade to improve the efficiency and equity of strategic crops.

In Honduras, an NGO (TechnoServe) and a farmer organization (Asociación de Productores de Hortalizas y Frutales de Intibucá) are leading a partnership with donors and private companies to improve the productivity of horticulture. The country is relatively poor, with high population density and a per capita GDP below US\$ 4,000 year.

This value-chain intervention focused on the impoverished region of Intibucá, where smallholders formed a strong organization and diversified their crop production but needed a jump-start from external investors to access higher-value domestic and foreign markets. Together, the partners invested in enhancing resource productivity, building organizational capacity and targeting consumers.

The farmer organization now contracts with sophisticated regional buyers such as Grupo Comidas Especializadas. In just two years, participating farmers boosted yields by 50% and realized prices by 30%. The capital inflow has not only funded sector upgrades and additional employment through such enterprises as new processing facilities, but also improved living standards, including higher rates of school participation and access to potable water.



### **c** A Proposed Infrastructure Corridor: Beira Agricultural Growth Corridor

Businesses allied with the government and international donors to build infrastructure in central Mozambique, where over 10 million hectares of high-potential land remain commercially underdeveloped. The Beira Agricultural Growth Corridor is intended to reduce early-mover risk and create economies of scale for investors by coordinating projects in advance – literally laying the groundwork for an active rural economy.

Inspired by the success of the Cerrado, which has a similar ecosystem, investors hope to make this region a global source of maize, sugar, horticulture and soy. Improved infrastructure, such as a freight network and high-capacity port, will catalyse production and link it with global markets. Construction is anchored to major mining programmes, commercial farms, smallholder aggregation and enhancements of railways that connect to the port in Beira.

Proponents hope to use the technological, financial and managerial capabilities of global investors along with the regional expertise of domestic players to bolster local business. By facilitating commercial opportunities for sophisticated private players, the corridor will upgrade the supply chain and attract resources for smallholders, such as financing, improved seed, agri-dealers, storage facilities and links to deeper demand. A goal is to ensure equitable growth through models that benefit smallholders and protect their communities. To this end, commercial

farms are designed to serve as hubs for outgrowers and provide services such as irrigation to smaller farmers.

The partnership comprises a broad array of stakeholders, including governments, donors and businesses, organized around a detailed investment plan. Together, they hope to raise farming revenues by US\$ 1 billion and tax receipts by US\$ 50 million annually, create 350,000 new jobs and improve market access for 200,000 smallholders.



### **d** A Breadbasket: The Ghana Northern Region

Concentrating resources in areas with the most agricultural promise can maximize efficiency, improve food security and create economic surplus for off-farm development. To this end, the breadbasket approach upgrades all elements of the value chain in a region that has the potential to produce a large share of a country's staple food requirements.



The Government of Ghana and the Alliance for a Green Revolution in Africa (AGRA) are leading a coalition to apply this strategy. Stakeholders identified four breadbaskets to support the country's economic goals, staple self-sufficiency and smallholder income. They tackled the northern region first, both for its high stakes and high potential: it is the poorest region but has great agricultural capacity with large areas of uncultivated land, good water supply and lagging yields.

The strategy involves smallholder aggregation, socially inclusive commercial farms on undeveloped land to stabilize supply and generate employment, and interventions to boost access to inputs and credit. While the focus is on achieving self-sufficiency in cereals, the strategy facilitates the market links necessary for high-value crop cultivation and supports boosting production of local fruits and vegetables.

The plan mobilizes the local private sector as change agents: about 250 entrepreneurs, such as SME owners and small warehouse operators, support smallholders and interface initiatives of the government, donors, input/off-take companies and commercial banks. National players with deep regional knowledge find investment opportunities in supplying domestic food markets and global agri-business companies can use sophisticated technology and large-scale production mastery to secure export markets.

In the northern region alone, the plan should double the incomes of 250,000 poor farmers to about US\$ 750 a year, increase national rice self-sufficiency to 70% and boost agricultural GDP by US\$ 500 million.

# Moving Forward Together

These transformation models build on the lessons of past successes and try to address shortcomings of previous approaches by being socially inclusive, forward-looking and market-oriented. They address the lack of multistakeholder coordination that has historically prevented many agriculture interventions from realizing lasting impact or commercial viability. A better transformation plan is a large part of the path forward, as is well-orchestrated implementation.

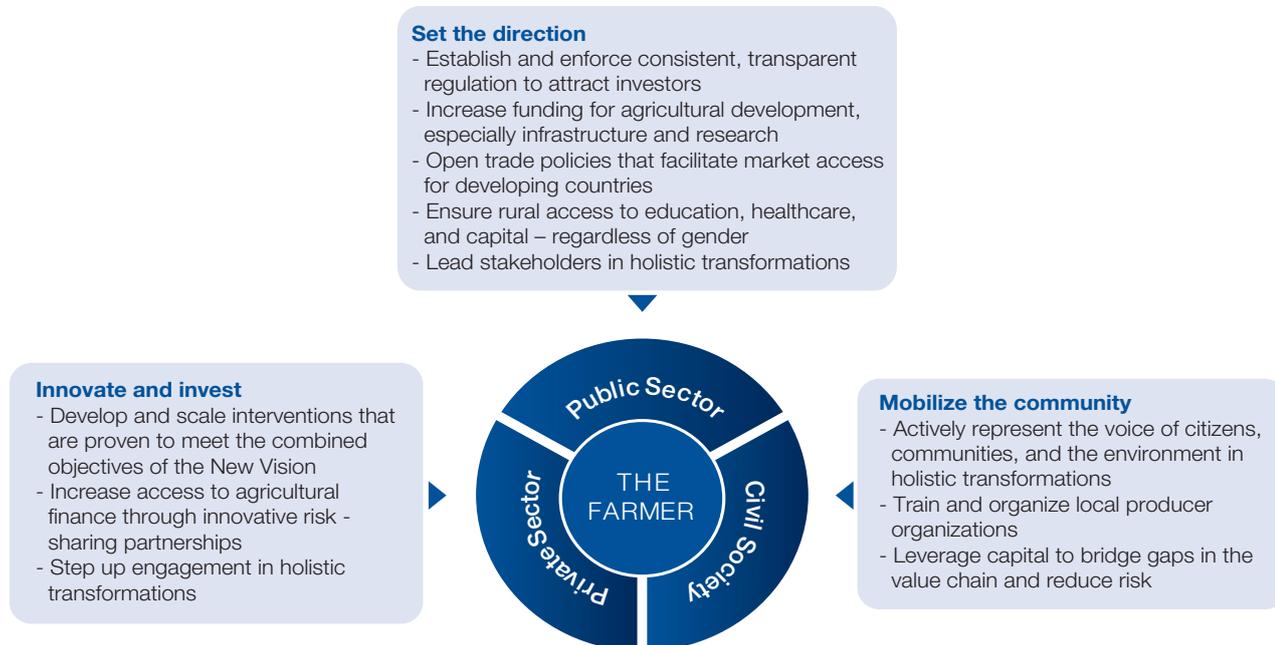
Given the capacity restraints of many governments, large-scale change programmes are increasingly using short-term “special delivery units” or project management offices, vested with the authority to balance stakeholder interests, coordinate investments and ensure timely implementation of commitments. In the right circumstances, these can be valuable in delivering mutually accepted results.

We encourage stakeholders to build on the examples presented here and develop additional ways of working together to create viable, inclusive markets that address local nutritional, environmental and social needs. These can be initiated by any organization that is willing to take the lead: public, private or civil. The opportunity is sufficiently great and circumstances sufficiently diverse for each stakeholder to champion change in its areas of expertise and passion.

The success of any development initiative ultimately relies on delivering local results, so programmes must be implemented to empower individual decision-making and enable community ownership. Effective models are often designed for a country or region, where programmes driven by national leaders can achieve scale within the unique cultural context.

The changes necessary also depend on a robust global market. This implies a shift in mindset and policy for developed and developing countries. For instance, as long as commodity prices fail to factor in environmental costs, industry will have an incentive to overdraw: some form of compensation for environmental service would greatly improve the long-term management of natural resources. Furthermore, tariff and non-tariff barriers continue to skew production costs and obstruct the efficient flow of goods and services across borders; consistent trade policies promote competitiveness, fairness and stable distribution.

What is clear is that every stakeholder has a critical role to play, and the scale of the challenge will require an intensification of efforts across the board. In particular, governments must set the direction for their countries’ agricultural development and play a strong leadership role in holistic transformation. Businesses should stretch to innovate and invest, tactically driving implementation of the New Vision through the market.



Global companies can leverage their resources to engage and strengthen local enterprises and partner with diverse stakeholders to deliver results at scale. Civil society – including NGOs and foundations – can mobilize the community to meet its unique social, environmental and economic needs. It can also demonstrate innovative programmes that can be scaled by governments and businesses, and provide risk mitigation tools that build market confidence. In fulfilling these roles, each sector should bolster the availability of affordable financing, the scope of research and the capacity of local leaders.

The companies leading this initiative commit to realizing the New Vision for Agriculture. But we cannot do this alone. Success will require the innovative strength of industry, the leadership of government, the community mobilization of civil society and the entrepreneurship of farmers.

## What will you do?



## **Operating principles of the New Vision for Agriculture**

**Mobilize the private sector  
to unleash agriculture as core driver of future  
growth and stability**

**Employ market-based solutions  
to activate public and private investments**

**Empower farmers and entrepreneurs  
to reach their full potential**

**Integrate interventions  
to achieve momentum and scale**

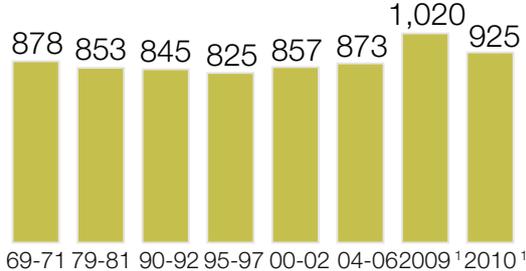
**Collaborate  
with diverse stakeholders to build  
on strengths and distribute risk**

# Appendix A: The three goals of the New Vision

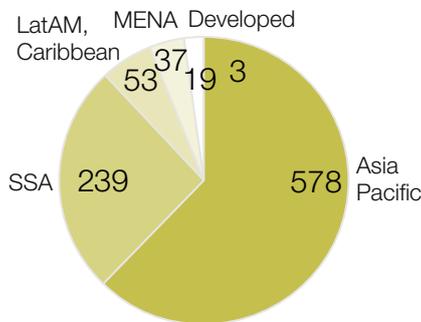
The first goal is to meet nutritional demands while providing affordable choices across the food value chain

## FOOD SECURITY

Number of hungry people worldwide is still staggering  
Undernourished (m)



...Particularly in developing countries  
2010 estimates (m)



### The Goal of the New Vision for Agriculture

Increase agricultural production by 20% each decade and drastically reduce waste, towards the end of eliminating hunger and undernourishment

	2010	2030 <sup>2</sup>
<b>Production (2009)</b>		
Billion MT <sup>3</sup>	11.2	19.0
<b>Nourishment</b>		
# Undernourished	925	592
<b>Cereal yield<sup>4</sup> (2009)</b>		
MT/ha	3.19	5.42

### Other metrics to be tracked using best data available:

- Post-harvest losses
- Stunting and malnutrition
- Portion of income spent on food (particularly by poorest quartile)
- Child mortality, weight (under 5 years of age)
- Retail/consumer waste
- Obesity and diabetes

1 Estimated

2 Based on UN World Population Prospects, 2008 Revision

3 Primary crops, primary eggs, total meat, and total milk worldwide, per FAO

4 Rice Milled Equivalent, per FAO

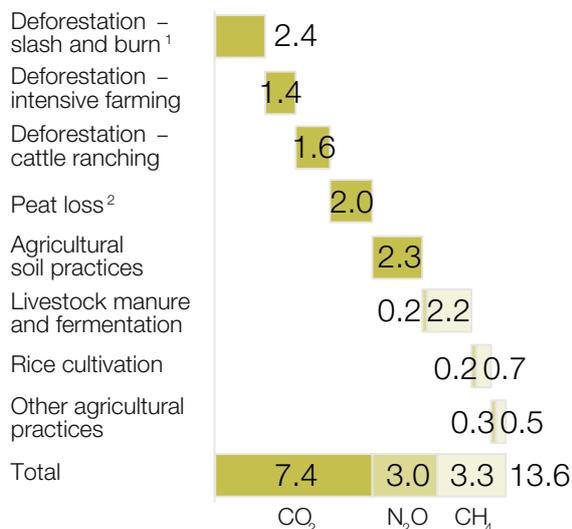
Source: FAO

The second goal is to conserve or enhance the quality and quantity of natural resources and meet the challenges of changing climate

## ENVIRONMENTAL SUSTAINABILITY

### Considering greenhouse gases alone, 30% of global emissions come from agriculture and forestry

GtCO<sub>2</sub>e/year



### The Goal of the New Vision for Agriculture

Sustainably reduce impact of agriculture on the environment; reduce resource intensity of the footprint by 20% each decade

	2005	2030
<b>Greenhouse Gases (Gt)</b>		
emissions/tonne of production	1.3	0.75
<b>Water</b>		
M <sup>3</sup> e/tonnes produced <sup>3</sup>	2.6	1.5

### Other metrics to be tracked using best data available:

- Adaptation (e.g., % crop lost in drought years, use of stress-tolerant seed)
- Biodiversity
- Soil health
- Deforestation, land use

1 Land use, land-use change, and forestry emissions mainly stem from deforestation of tropical forests, both for logging and agriculture

2 Agriculture emissions are mostly made off nitrous oxide emissions from soil practices and methane emissions from livestock raising

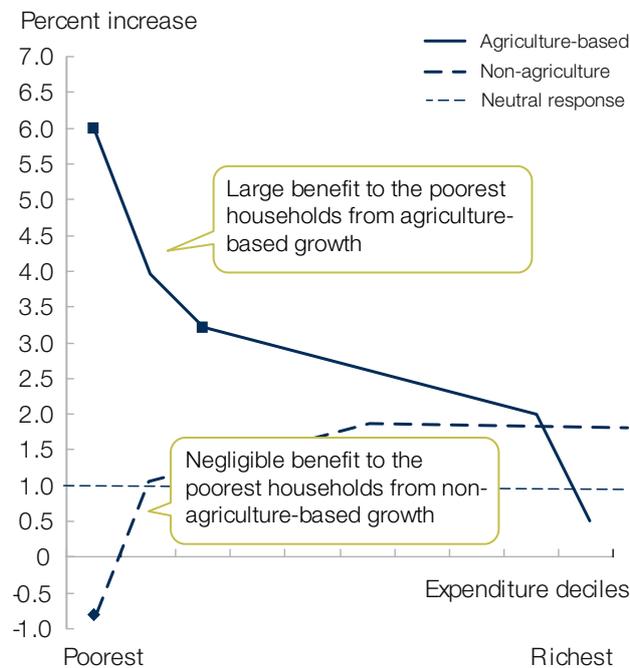
3 Tonnes of cereal; Green, blue, and gray water as measured by the water footprint network (1997-2001 average) – ultimately more effective at national level

Source: World Resource Institute; Grantham Research Institute; Global GHG Abatement Cost Curve v2.0, McKinsey; Water Footprint Network

The third goal is to drive rural and national economic development around the globe with well-targeted investments

**ECONOMIC GROWTH**

**Ag development particularly helps the poor, as shown by Expenditure (income) gains induced by 1% GDP growth<sup>1</sup>**



**The Goal of the New Vision for Agriculture**

Decrease portion of rural inhabitants living on less than \$1.25/ day by 20% each decade

	2002	2030
<b>Poverty</b>		
% under \$1.25/ day	30%	16%
% under \$2/ day	70%	38%

**Other metrics to be tracked using best data available:**

- Agricultural value added (contribution to GDP)
- FDI in Agriculture, Trade
- %Population with access to electricity, roads, water
- Child mortality, weight (under 5 years of age)
- Ease of doing business
- Infrastructure

<sup>1</sup> Based on data from 42 countries during the period 1981-2003; Expenditure is equivalent to income in growth accounting

Source: Ligon and Sadoulet 2007 "Estimating the Effects of Aggregate Agricultural Growth on the Distribution of Expenditures." Background paper for World Development Report 2008

# Appendix B: Implementing the New Vision

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Successful Transformations Require Investors and Partners to Work in Concert to Overcome Critical Obstacles

## Steps towards Enacting the New Vision

### 1. Understand institutional capabilities

- Determine your organization's core role in the agricultural value chain, evaluating internal strengths, competencies and passions
- Consider geographic priorities (e.g. concentrations of supply/demand, breadbasket regions)

### 2. Ally with strategic partners

- Establish aspirations for a specific region or value chain
- Balance stakeholder strengths and leverage existing partnerships, regional dialogues and frameworks

### 3. Assess the agriculture system holistically

- Assess the agriculture system holistically
- Determine the priority actions and interventions with highest return
- Build a comprehensive plan, addressing solution from input to consumption
- Rally a complete coalition of investors and implementing agents

### 4. Implement a coordinated plan of action

- Set measurable targets for local food security, environmental sustainability and economic opportunity
- Allocate long-term resources, buffering for the unexpected
- Establish clear responsibilities and means for accountability
- Monitor progress and invite feedback, adapting the approach accordingly
- Scale successful initiatives/extend resources based on performance

### 5. Ramp down, allowing markets to sustain the momentum

Experience Underscores Key Roles and Responsibilities for Each Stakeholder Group

### Private Sector: Businesses & Consumers

- Continuously **evolve product offerings** to target nutritional, environmental and economic needs
- Design **simple, affordable** “base of the pyramid” products and technologies
- Ensure availability of long-term, affordable credit and **financing**
- Leverage **sophisticated R & D** technology to address complex social needs
- Enforce **results** orientation
- Make **expertise** available in pre-competitive environment
- Share/**offset risks** of smallholders, vulnerable producers
- Leverage **local processing and distribution** channels
- Invest in **welfare of workforce** (e.g. development, benefits)

### Public Sector: Governments & Multilaterals

- Ensure basic **infrastructure**
- **Prioritize agriculture** in public spending (or in food security efforts of donor aid)
- Deliver consistent, **transparent business regulations** (e.g. trade, investment, financing)
- Enforce **good governance**, particularly in social safety net programmes, contracts
- Facilitate land tenure rights, **property administration**
- Secure a stable **investment environment**, assuring ethical opportunities for profit
- Impose **strict, evidence-based safety standards**
- Promote **gender parity** in contracts, services, resources
- **Guard social welfare**, facilitating fair and inclusive growth

### Civil Society: NGOs & Foundations

- Pilot **innovative programmes** that can be scaled
- Adapt models to meet **cultural/political contexts**
- Actively **convey voice of farmers, consumers and environment**
- Provide external source of credibility and **accountability**
- Facilitate **risk-sharing** on behalf of smallholders/ unconventional borrowers
- Make **upfront investments** to attract and catalyse capital
- Offer a forum/**framework for competitors** to align on social objectives
- Provide training, **skill-building**
- Ensure **basic needs** of the most vulnerable (e.g. landless, disaster victims)

# Acknowledgements

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## Project Leadership and Support

### Project Board Members

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### Schwab Foundation for Social Entrepreneurs

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