



## **Global Food and Agriculture Productivity: The Investment Challenge**

*A Review by*  
Global Harvest Initiative

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## I. Food Productivity Growth and Needs

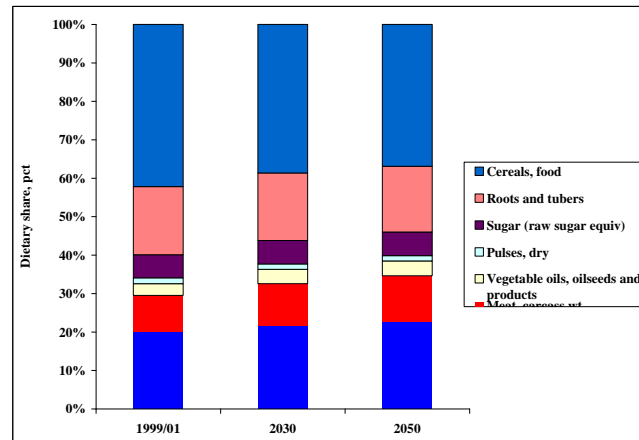
It now is widely accepted that global agricultural output must double by mid-century to meet the needs of a growing and increasingly affluent population. This certainly will not be an easy task, and many skeptics believe that the may well fail to achieve those goals. There are several reasons.

- The “conventional” approach to expanding food supplies is to bring additional land into cultivation but is becoming steadily less feasible. Most of the readily accessible arable land is already in use and that remaining requires growing investment in irrigation or other preparation.
- The most usual way to increase productivity is to supplement soil nutrients, but in most developing countries, producers lack the resources to buy the commercial fertilizers they need—and, suffer very low yields as a result.
- An additional way to increase productivity, through irrigation, is itself constrained in many locations by competition for available water from residential or industrial users—pressures that reduce the absolute availability of water in many locations and its cost in many others.
- Not only does agriculture face growing demands for food, but it also faces severe resource constraints in the form of global social pressures to reduce the industry’s environmental footprint—to use less water per unit of food output, to reduce soil and water pollution and erosion, and to reduce the overall impact of cultivation on the soil. Additional impacts are expected from changes in the climate that may reduce production potential in important producing areas of the globe.

By 2050 global per capita income is expected to increase to nearly three times the 2005 level. While developed country growth continues at less than 2 percent annually, the pace in developing countries could exceed 5 percent, a trend that began in the 1990s and which has enormous implications for global agriculture because it creates more and more consumers with incomes high enough to support dramatically different food spending patterns. This implies obvious benefits for these millions of consumers, but also threatens higher food costs should agricultural productivity lag—an especially damaging trend for the poorest consumers.

These changes will effect global market composition and resource needs. Today, cereals and root and tuber crops make up more than 60 percent of the diet of the world’s population, but by 2050, FAO expects that these staples will account for 54 percent of food consumption, while animal proteins (meat and dairy) and vegetable oils account for nearly 40 percent--up from today’s one-third share (Chart 1). These estimates do not include fresh fruits and vegetables, for which demand is also expected to rise substantially.

Chart 1. Dietary Shares, 1999-2050



*Source: World Agriculture Towards 2030/2050, FAO, Rome, June, 2006.*

Thus, while there may be some uncertainty about exactly how fast global populations will expand, and how fast future economic growth will be in each part of the world, the directions of those trends are clear—as are their implications for future food needs. Taken together, these trends imply that the necessary growth in food production likely can be achieved with continued application of modern technology, but certainly not without it.<sup>1</sup>

Even now, following sharp increases in agricultural commodity prices during 2006-08 and again this fall and winter, concerns that agricultural production may not be keeping up with demand are growing.<sup>2</sup> In an effort to evaluate drivers of the global food system's productivity growth, USDA recently assessed links between growth and relative prices, access to technology, availability of improved management and other highly complicated factors including longer-term investments in research and development.<sup>3</sup>

<sup>1</sup> *How to Feed the World in 2050*, FAO, 2009

<sup>2</sup> Fuglie, Keith O., *Accelerated Productivity Growth Offsets Decline in Resource Expansion in Global Agriculture*, ERS, USDA, based on *Total Factor Productivity in the Global Agricultural Economy from 1961 to 2006: Evidence from FAO Data in The Shifting Patterns of Agricultural Production and Productivity Worldwide*, by Alston, Babcock and Pardey, Midwest Agribusiness Trade and Research information Center, 2010.

<sup>3</sup> To measure productivity, USDA uses a broad measure that reflects “total factor productivity,” that is the total inputs used per unit of output. Each 1-percent increase in TFP, for example, means that 1 percent fewer agricultural resources are required to produce a given bundle of crop and livestock outputs. This means that, if prices remain unchanged, then the average cost of production falls by 1 percent. Previous estimates of TFP change in agriculture have generally been limited to individual countries, however because information on input use and production costs is often incomplete. However, USDA is able to assess global productivity change and bring together the results of more than a dozen country- and region-specific studies on agricultural productivity—and, to make “reasoned extrapolations” for the rest of the world and aggregates these results using a consistent framework. While the ERS-USDA approach does not compare levels of agricultural TFP across countries directly it does provide a measure of the growth in agricultural productivity over time for each country, global region, and the world.

For example, Global agricultural output grew about 2.2 percent annually in 1961-2007, with an exceptionally high rate of 2.8 percent per year in the 1960s before dropping to an annual rate of 2.0 to 2.3 percent for each decade since the 1970s (See Box).

Increases in fertilizer use were a leading source of agricultural output growth in the 1960s and 1970s, especially since Green Revolution cereal crop varieties proved highly responsive to fertilizer and became widely available in developing countries. For example, fertilizer use was encouraged by the Soviet Union and expanded sharply across the region during these decades, reflecting heavily subsidized costs. Later, when growth in agricultural production inputs slowed in most regions, productivity growth accelerated to maintain real output growth at just over 2 percent per year.<sup>4</sup>

In industrialized countries, growth in productivity helped offset declines in production resources, even though productivity growth averaged only 0.9 percent per year during 2000-07, the slowest of any decade since 1961. The dissolution of the USSR in 1991 had meant a major shock for agriculture across the former bloc, and agricultural resource availability contracted sharply and output fell. However, by 2000, resource availability had stabilized and growth resumed as productivity grew across the sector.

For developing countries as a group, productivity growth began accelerating in the 1980s but most was concentrated in a few large developing countries, particularly China and Brazil as other regions fell behind, including Sub-Saharan Africa, West Asia, and the Caribbean.

**Prospects for the Future.** While the USDA reports no evidence of a general decline in global productivity through 2007, it does see a significant slowdown in the expansion of resources employed in agriculture and therefore an increasing reliance on productivity. The agency concludes that the decline in the rate of growth in agricultural resource use was partly a consequence of declining or low real (inflation-adjusted) agricultural commodity prices between 1981 and 2005 that allowed capital and labor to be attracted away from agriculture, but increased the cost of some production resources, including land in many areas. Now, the substantially higher real agricultural prices since 2005 are expected to increase the rate of global agricultural investment and real output growth in the short run.<sup>5</sup>

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<sup>4</sup> Resource expansion in global agriculture was exceptionally low during the 1990s due to the rapid withdrawal of resources from agriculture in the countries of the former Soviet bloc. But many of the inputs used in these countries were apparently not efficiently applied, as their withdrawal significantly increased the average productivity of the resources remaining in agriculture, shown by the high productivity growth rate in the 1990s. By 2000, agricultural resources in the former Soviet Union had stabilized and the rate of global input growth recovered compared with that of the 1990s, but was still markedly lower than input growth in the 1960s, 1970s and 1980s.

<sup>5</sup> This problem, USDA concludes, does not show up in global productivity growth trends because developing country growth rates have traditionally been low. Still, it is holding agricultural performance well below potential and helps to “keep these countries poor,” especially in Sub-Saharan Africa, but the category also includes countries in West Asia and the Caribbean. Strengthening research, extension, and rural education in these countries, as well as maintaining these capacities in more advanced countries, is seen as a requisite for enhancing long-term agricultural productivity growth. Source: *Ibid.*

## II. The Productivity Gap

**Measuring the Gap.** For the world as a whole, agricultural productivity grew by an average of 1.4 percent per year between 2000 and 2007, the last year for which estimates are available.<sup>6</sup> However, USDA concludes that the global food challenge—doubling agricultural output by 2050 without increasing the sector’s environmental footprint will require growth of at least 1.75 percent annually, one-fourth above its present rate.

This implies the need to reverse the declining trend in investments in agricultural research and extension in some developed and many developing countries. It also likely will depend on reform of policies that impede the dissemination of new technologies and reduce incentives for farmers to increase their productivity. Better coordination between the public and private sectors in agricultural research and development is also needed to raise the research productivity of each sector.

Cross-country comparisons show that countries that have made greater investments in “technology capacity” (research, extension, and rural education) also tend to achieve higher agricultural total factor productivity (TFP) growth rates. But technological capacity and productivity growth continue to vary widely around the world, so closing that gap will require major new investments in technology in both developing and developed countries.<sup>7</sup>

Observers of productivity trends suggest that while a target of increasing annual TFP growth from 1.4 percent to 1.75 percent may not seem like a big challenge, it will require years to achieve these targets:

- Dramatically increasing the efficiency of water utilization, including the development of drought-tolerant crops.
- Focusing on sustainable use of croplands.
- Maximizing yields through scientific advancements in cropping and livestock systems.
- Improving nutrient utilization.
- Raising human labor productivity with mechanization.
- Improving utilization of feedstuffs by livestock.

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<sup>6</sup> *2010 Gap Report, Measuring Global Agricultural Productivity, Global Harvest Initiative*, October, 2010

<sup>7</sup> While the development and adoption of new technology is key to raising productivity growth, research alone is seen as unlikely to close the gap. Agricultural resources and population are not distributed evenly over the planet. If agricultural production is to take place where it will achieve the greatest level of efficiency and minimize environmental impacts, agricultural and trade policies must be structured to provide appropriate incentives. Closing the gap also means eliminating waste of the crops that farmers grow. In developed countries much of the post-harvest loss occurs at the consumer level. In developing countries, however, post-harvest loss is due to lack of modern storage, transportation, and processing facilities. Closing the gap will mean focusing on productivity not only at the farm level, but also in the entire food system. Significant public and private investments in capital and infrastructure will be required. Source: *Ibid.*

- Improving food system infrastructure and processing to benefit agricultural products distribution and minimize waste.<sup>8</sup>

### Capital Stock in Agriculture

Agricultural production and productivity depends heavily on capital, which depends heavily on investment from non-agricultural sectors. A major concern regarding the world's capacity to feed its people is sustaining and expanding the flow of capital into the sector (Table 1). In 1995 dollars, world capital stock in agriculture was estimated to have been just over \$4.1 trillion in 2007, including land valued at \$2.25 trillion, machinery worth \$0.55 trillion, livestock worth \$0.95 trillion and structures worth \$0.35 trillion.<sup>9</sup>

**Table 1. Agricultural Capital Stock by Components, 1975-2005**

	1975	2007
	\$ tril, 1995 \$	
Land	1.56	2.25
Livestock	0.94	0.95
Machinery	0.51	0.55
Structures	0.19	0.35
Total	3.2	4.1

Source: *Investment in Developing Countries' Food and Agriculture: Assessing Agricultural Capital Stocks and their Impact on Productivity*—FAO and University of Gottingen

This capital had been primarily in developed countries in the 1970s, but by 2005 the very rapid growth of a few developing countries such as China, Brazil and the former Soviet Union (Table 2) had shifted that location. And, while the overall growth rate was positive in both 1975-90 and 1990-07, the rate for developed countries was negative (Table 3).

<sup>8</sup> For example, the value of an efficient, well developed marketing chain is difficult to overstate. These services and inputs include transportation and storage, agricultural finance and access to low-cost credit. They include commodity processing and food product market development and the information services required to make these systems efficient. And, to increase efficiency and productivity throughout the chain, systems in both developed and developing countries depend heavily on public and private R&D and technical assistance systems.

<sup>9</sup> *Investment in Developing Countries' Food and Agriculture: Assessing Agricultural Capital Stocks and their Impact on Productivity*—FAO and University of Gottingen, Anriquez, Gustavo; de Haen, Hartwig; Nivyevskiy, Oleg & Von Cramon-Taubadel, Stevey

**Table 2. Agricultural Capital in Developed and Developing Countries, 1975-05**

	1975	2005
	\$ tril, 1995 \$	
Developed Countries	1.75	1.75
Developing Countries	1.45	2.35
Total	3.2	4.1

Source: *Investment in Developing Countries' Food and Agriculture: Assessing Agricultural Capital Stocks and their Impact on Productivity*—FAO and University of Gottingen

**Table 3. Growth in Agricultural Capital in Developed and Developing Countries**

	1975-90	1990-07
	annual change, %	
Developed Countries	0.6	-0.34
Developing Countries	1.66	1.23
World	1.11	0.5

Source: *Investment in Developing Countries' Food and Agriculture: Assessing Agricultural Capital Stocks and their Impact on Productivity*—FAO and University of Gottingen

While capital stock has been growing in many developing countries, two main trends are apparent. First, investment in developed countries has lagged in recent years so that there now is a stark contrast between developed countries (low ACS growth, high productivity growth) and developing countries (high ACS growth, low productivity growth). Second, capital/labor ratios have deteriorated significant in some areas, especially Sub-Saharan Africa (Table 4).

**Table 4. Growth in Agricultural Capital Stock, Selected Regions, 1975-07**

	1975-2007		
	ACS	Active Pop	ACS/Active person
	annual percent change, %		
LA & Carrib	1.29	-0.09	1.37
ME and NA	1.39	0.86	0.52
Sub-Saharan Africa	1.57	2.03	-0.46
Ease and SE Asia	1.75	1.01	0.74
South Asia	1.15	1.43	0.27

Source: *Investment in Developing Countries' Food and Agriculture: Assessing Agricultural Capital Stocks and their Impact on Productivity*—FAO and University of Gottingen

The World Bank examined closely the change in structure of agricultural capital stock in 30 major countries during 1970-2000 in an effort to measure impacts of investment on



productivity.<sup>10, 11</sup> Three categories of capital were estimated, fixed capital, livestock, and treestock. The data suggest that as economies grow, agricultural capital stocks accumulate and the composition of agricultural capital changes sharply with that growth.

The Bank examined investment across countries and over time and concluded that capital accumulation in global agriculture since 1970 has been positive in each of the 30 countries examined, with a median growth rate of 5.3 percent annually and a similar pattern of growth for each of the three capital components measured. For fixed capital and treestock, median growth rates were 5.6 and 5.7%, respectively. Livestock investments also grew in each of the countries, but its growth was slower than for the other two components (median of 3.6, with the distribution lying almost completely to the left of the others), suggesting a significant change in the composition of agricultural capital globally. The share of livestock in total agricultural capital declined in more than 90 percent of the countries examined.

Fixed capital grew rapidly during the 1970s, 7.3% per year, a rate that began to slow in the 1980s and continued into the 1990s, although fixed capital was still growing by 3.6%. Livestock grew at a similar pace in the 1970s and 1980s (3.9 and 4.0% respectively), but then experienced slower growth in the 1990s.

Treestock grew slower than fixed capital and livestock in the 1970s (3.2%) but grew at nearly double-digit growth rates in the 1980s. While the growth slowed in the 1990s, treestock continued to grow faster than fixed capital and livestock. Thus the decreasing share of livestock in total agricultural capital was due in part to the rapid growth in treestock in the 1980s and 1990s, as well as the slowdown in the accumulation of animal stocks in the 1990s.

In addition to the time dimension, there is enormous cross-country variability in agricultural capital stocks. High-income countries achieved higher growth rates of fixed capital (6.2% versus 5.5%), while the growth of treestock was considerably faster in middle- and lower-income countries (6.6% versus 4.0%). The growth rate of livestock was only slightly higher in middle- and lower-income countries (3.8% versus 3.3%).

These growth patterns led to interesting changes in the composition of capital for each income group. The shares of each component in total agricultural capital were similar across income groups in 1970, with nearly half of total agricultural capital composed of fixed capital, while treestock accounted for one-third, and livestock around percent (Table 5). By 2000, the differences in the composition of capital were pronounced. In high-income countries, the share of fixed capital did not change, but livestock only accounted for 9% of total agricultural capital and treestock increased to 45%. In middle-

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<sup>10</sup> Sample included 30 countries, including Australia, Austria, Canada, Cyprus, Denmark, Egypt, Finland, France, Greece, India, Indonesia, Italy, Kenya, Republic of Korea, Malawi, Mauritius, Morocco, the Netherlands, Norway, Pakistan, Peru, the Philippines, Sri Lanka, Sweden, Republic of Tanzania, Tunisia, Turkey, United Kingdom, United States, and Uruguay.

<sup>11</sup> The data set on agricultural capital stocks is available online at: [http://www.farmfoundation.org/news/articlefiles/1725-capital\\_update\\_2000.pdf](http://www.farmfoundation.org/news/articlefiles/1725-capital_update_2000.pdf).

and low-income countries, the share of treestock increased to 47% as well. Livestock still accounted for 17% of total agricultural capital, while the share of fixed capital fell to 37%.<sup>12</sup>

**Table 5. Growth Rates of Fixed Capital Stock, 1970-2000**

	30 Countries 1970-2000	Decades			Country Income Class	
		1970	1980	1990	High	Mid & Low
		<i>Average Annual Growth, %</i>				
Fixed Capital Stock 1/	5.86	7.31	4.24	3.58	6.26	5.51
Livestock	3.6	3.93	4.02	2.21	3.34	3.83
Treestock	5.37	3.18	9.93	5.89	4.01	6.57
Tractors	3.45	5.84	3.25	1.59	0.84	5.79

1/ Structures and Equipment

Source: *Measures of Fixed Capital in Agriculture, WB Policy Research Paper 5472, 2010*

The Bank study also measures capital intensity in the 1980s (the ratio of fixed capital stock to GDP in agriculture) against structural transformation in the 1990s (as measured by the percentage decline in the ratio of agricultural labor to total labor). It concludes that there is a positive relationship between growth in agricultural fixed capital stocks and economic growth.

**Development Thresholds.** Effective efforts to close gaps in productivity require a clear understanding of what caused them in the first place. Reviews of global experience since World War II offer both positive and negative examples, but, to an important degree, suggest that strong growth reflects supportive policies and programs, including:

<sup>12</sup> The World Bank concludes that its new, national account-based database on agricultural fixed capital has several advantages, and provides a better theoretical basis for the construction of measures of fixed capital so that they include structures and all types of equipment and machinery. From the United Nations' System of National Accounts (2008), fixed assets are defined as "produced assets that are used repeatedly or continuously in production processes for more than one year." Tractors represent one component of fixed capital. The obvious drawback to the new database is the limited availability of national accounts data on gross fixed capital formation needed to construct the stock of fixed capital.

In the absence of cross-country data sets on agricultural fixed capital, the most commonly used proxy is FAO data on the numbers of tractors in use, a partial measure that does not include buildings, irrigation systems, local infrastructure or other types of machinery, nor does it take account of the varying quality and horsepower of tractors. In fact, the FAO data series on the numbers of tractors in use and the World Bank data on agricultural fixed capital (of which tractors are one component) for each country correlates poorly, with the average country correlations of 0.43 and the median correlation of 0.8. For half of the countries in the WB study, the data series are somewhat correlated, but only 30% of the sample have correlations greater than 0.9—while the correlation was actually negative for seven countries.

However, the Bank observes that the decade growth rates for both tractors and fixed capital show similar patterns of slowing growth overall, but with key differences by income groups. In higher income countries, there was very little growth in tractors, while fixed capital stocks grew at over 6%. It concludes that tractors are not a convincing proxy for agricultural fixed capital, and, by inference, of total agricultural capital. Source: *Measures of Fixed Capital in Agriculture, WB Policy Research Paper 5472, 2010*

- Open markets, national economic stability and effective policy support for investment and trade, as well as assistance for the poor and protection from domestic or international exploitation, including;
  - Access to stable, abundant capital and credit; and
  - Access to international markets—there is a powerful and demonstrable correlation between the openness of an economy and its citizens’ prosperity.
- National social policies that promote health and education, and food safety;
- National agricultural policies to promote investment in food and fiber production, infrastructure and markets; and
- Access to technology in the form of farming machinery, inputs (including improved seeds, nutrients and protections), water management and training.

Not only have these “development fundamentals” been crucial to growth but the degree to which they were present is highly correlated with growth rates. In fact, only within such structures do investment flows reliably support competitive business operations and an effective balance of:

- Investment in “hard infrastructure” including farm-to-market roads, electrical power facilities, storage, water management facilities for flood control and irrigation, docks and rail lines to facilitate distribution and trade, research facilities, among others.
- Development of “soft infrastructure” including the elimination of legal, financial and social barriers to land ownership, property rights delineations, definitions and protections. In addition, development often depends upon outreach and extension services to farmers that promote improved farming practices, effective land and water stewardship and utilization, market information systems, and creation of appropriate rural and farm policy environments.
- Dependence on trade, as food production and consumption increasingly occur in different places.

Both challenges—closing the “gaps” and increasing the overall pace of productivity growth are difficult, especially the former. However, while efforts to boost developing country productivity have been an international goal for many decades, they have not always received priority attention and progress has often been disappointing.

**Importance of Investment Balance.** Agricultural productivity depends on access to productive land and adequate water, adequate short and long-term capital, together with trained management. However, it also requires a balanced system with access to well adapted inputs, supply- and market-chain services and efficient markets. Each of these elements is essential to strong productivity growth.

In developed economies, efficient agricultural production units and supply- and market-chains largely develop privately, even though they often depend heavily on public institutions with private investment the main economic engine, a model that reflects long-term development trends in Europe, Japan and the United States, much of Latin America and elsewhere. Such systems expand because of the investment they attract, which depends, in turn, on balanced access among economic and social components. When the potential for additional productivity growth exists, the increased economic returns implied lead to additional investment and overall system growth.

By contrast, the lack of balance in any part of the system inhibits growth. Obviously, the lack of productive land or adequate water constrains growth directly, but the lack of other components of a balanced system also can have important, if less direct impacts. While upgrading agricultural technology for farms facing “system constraints” can still boost productivity, its benefits tend to fall short of those from a similar investment in a balanced system.

Balanced systems often have flexibility to substitute private for public support in many areas such as transportation or technology development or processing—as has occurred in Brazil, the United States and elsewhere. In these economies, larger-scale operations frequently develop their own private transportation and other infrastructures in the absence of public services, and, in some cases, operate virtually integrated marketing chains (joined by information technology) while meeting modern regulatory standards.

Balanced systems also tend to display several essential components of sustained productivity growth, including strengthening system balance to stimulate growth, increasing both the access to and use of productivity-focused technologies, and strengthening developed-country support for basic infrastructure in least developed countries.

The important role of balance in development efforts can be seen in the Millennium Challenge Corporation approach that emphasizes the extremely complex role that agriculture plays in the economy of many developing countries and its role as a provider of investment opportunities for the private sector and as a prime driver of agriculture-related industries and the rural non-farm economy.

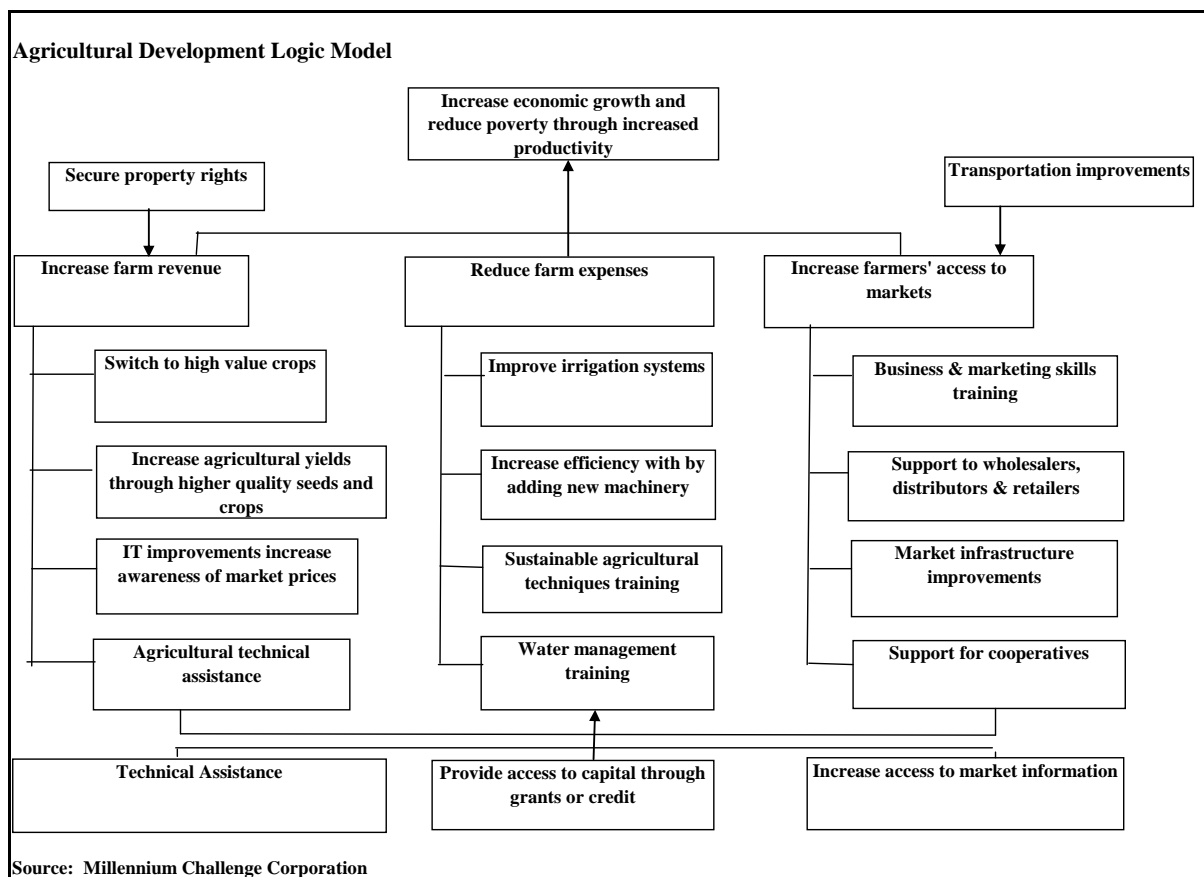
The link between an adequate infrastructure and agricultural development can be seen clearly in the MCC’s logic model—even when the developmental focus is agriculture, support for infrastructure is seen as essential and as an effective approach that strengthens the other direct investment and assistance tools (Chart 2).

Agricultural programs designed to contribute to poverty reduction and economic growth work by making agriculture more competitive, productive and profitable, leading to higher sales, additional employment opportunities, and improved farm household livelihoods. These programs can use very different paths of intervention, but often include training and extension to farmers and/or agribusinesses, increased access to

inputs, such as improved seeds, fertilizers, or veterinary services, and support to farmers' associations as a vehicle for greater market participation. Some programs focus on traditional crops and livestock, while others seek to offer incentives to switch to alternative, higher value production.

Because of the complexity of the development challenge for agricultural sector in lower income developing countries, MCC programs balance interventions in agriculture with substantial investments in infrastructure, financial sector and small business development or land tenure reforms. The impacts of these programs on household income are measured taking into account the combined effects of these interventions.

**Chart 2. Agricultural Development Logic Model**



**Crop Yields as a Productivity Indicator**

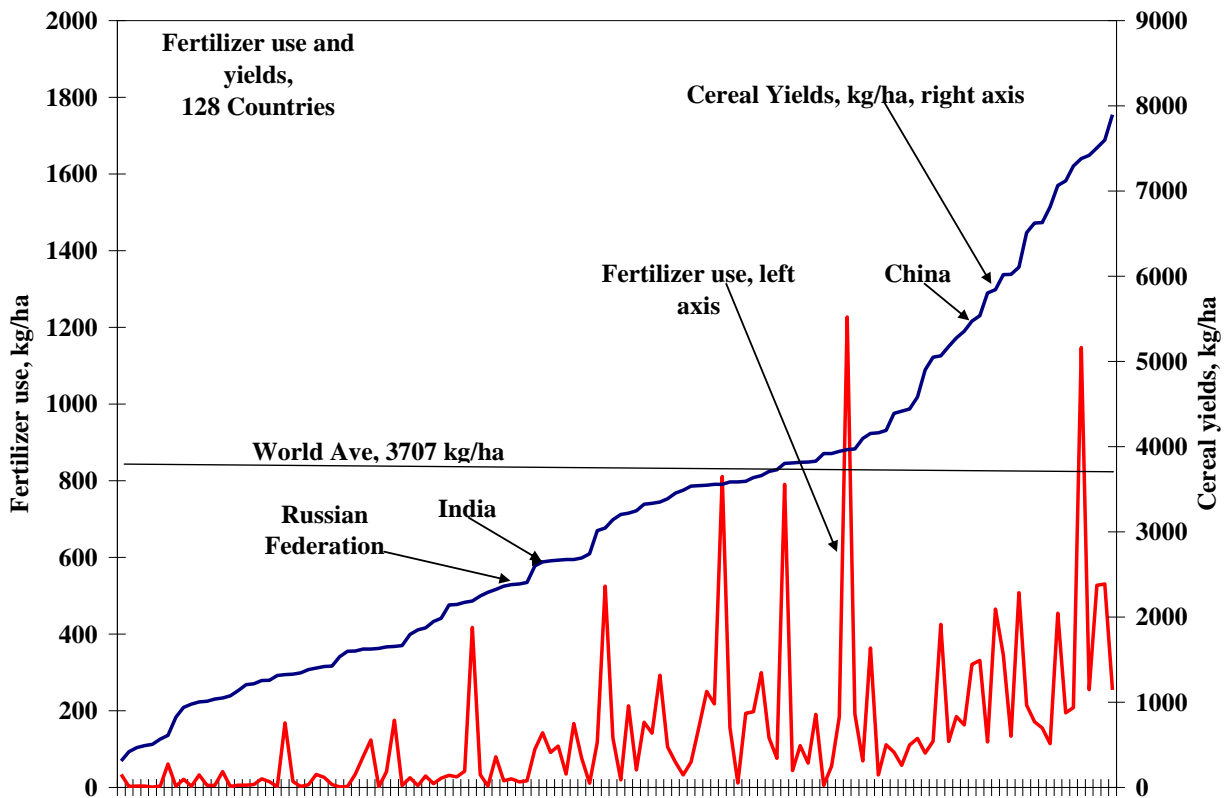
While development and productivity growth depend on a range of factors, cereal yields are a primary indicator of productivity and the effective use of fertilizer serves as a companion indicator of the level of development of the production process, including access to improved management practices, to inputs including credit, machinery, improved genetics and others.

In this regard, the association between fertilizer use and cereal yields is particularly striking, if not surprising--it was a major focus of earlier Green Revolution development efforts. Still, across all countries which report cereal yields and fertilizer use to the World Bank, the dependence commercial fertilizer is clear although the range of that association is broad. A few countries report above-average fertilizer use with modest yield results, but none of the countries with high or very high yields achieved that productivity without well above average fertilizer application.

When countries are arranged into categories on the basis of their cereal yields, three groups emerge. The first is those with fundamental productivity constraints defined by levels of fertilizer use too low to support significant much productivity growth; the second includes those with relatively efficient fertilizer use patterns, but constrained by actual agronomic and crop production conditions. The third includes those organized to maximize productivity based on capital investment in management, machinery and technology.

Across the globe, those countries with very low fertilizer use have low yields—and the number of those countries is still large (Chart 3).

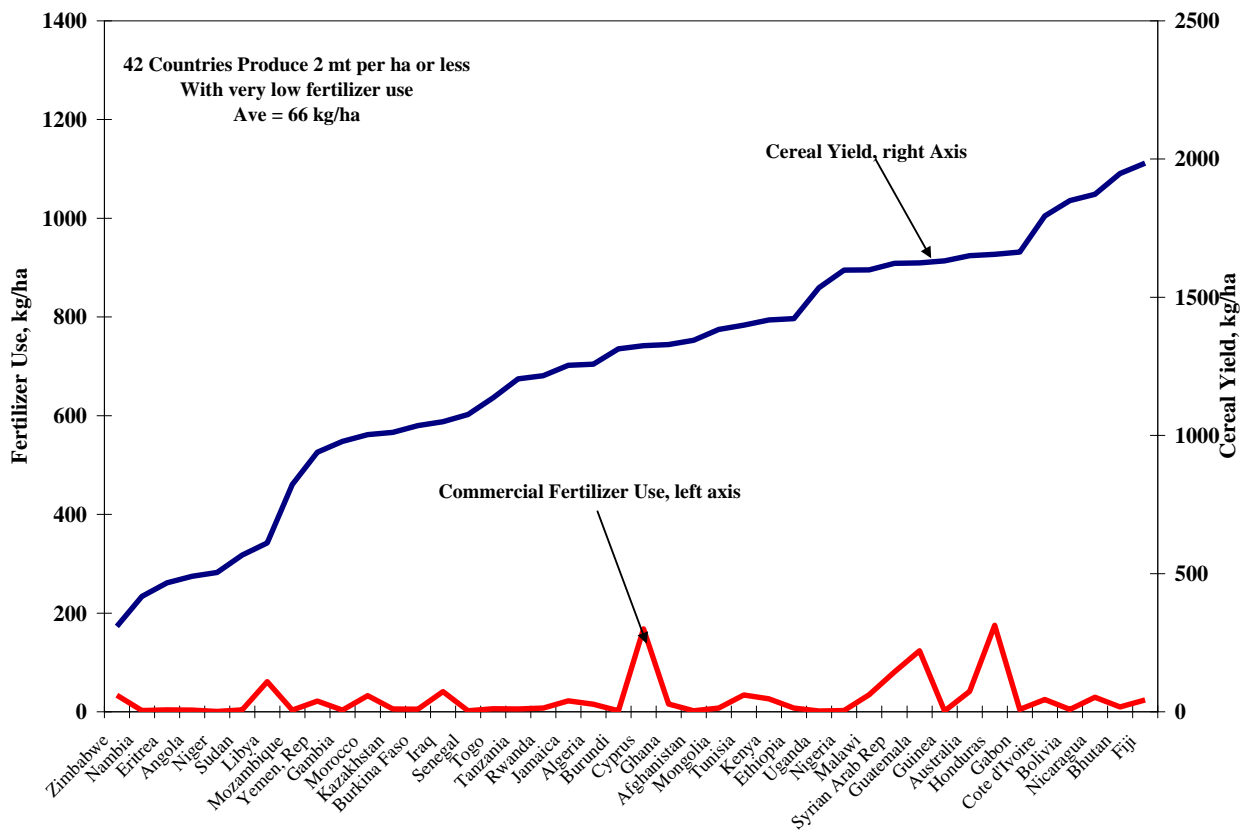
**Chart 3. Fertilizer Use and Cereal Yields, 128 Countries, 2007 & 2008 Data**



For the 42 countries that had low average cereal yields—of up to 2000 kg/ha—average fertilizer use in 2007 was 66 kg/ha. The list of those countries, sorted by yields, is in Chart 4. They are primarily in Sub-Saharan Africa.

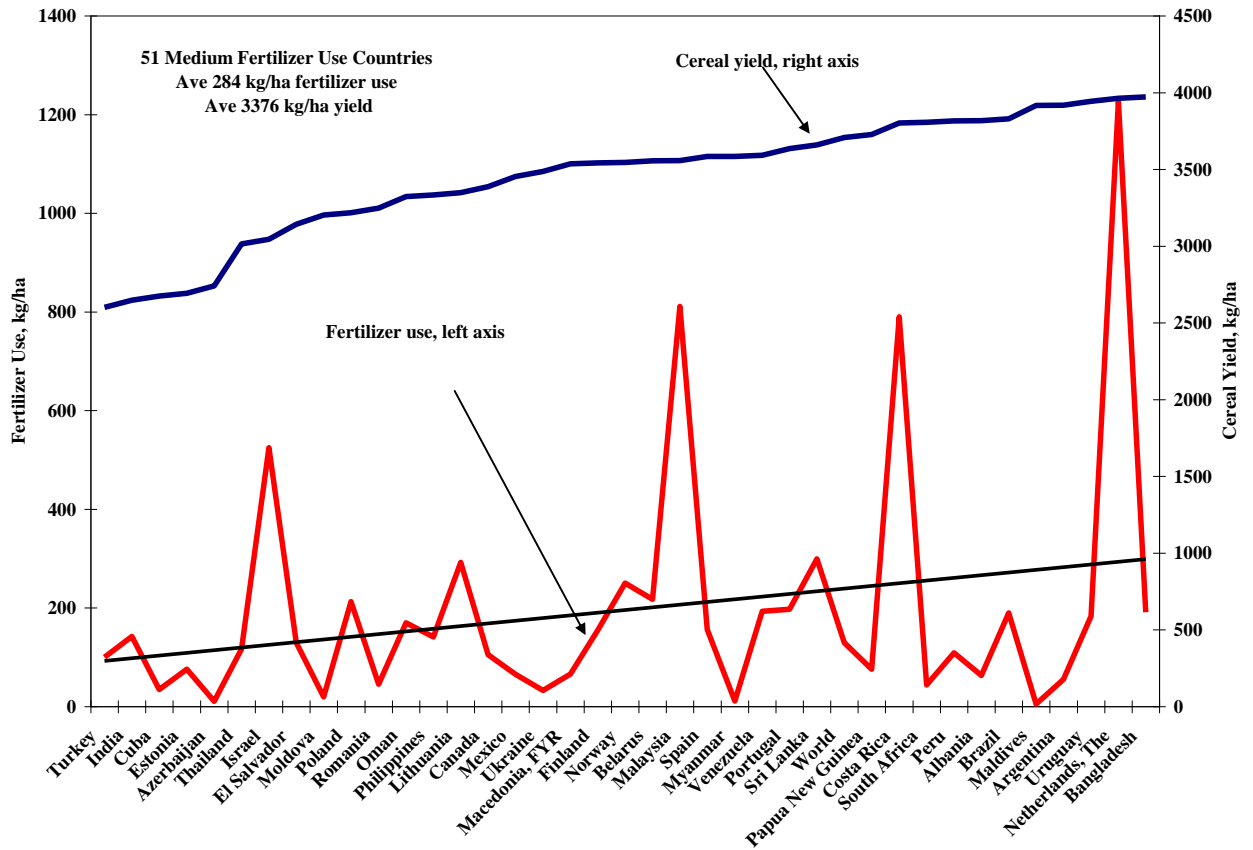
The “medium fertilizer” category is very different (Chart 5). For example, it includes a number of countries for which medium level fertilizer applications likely are quite efficient, including Canada, Israel, Norway, Spain, Brazil, India and a number of others, suggesting that for many of these nations, fertilizer use is near an agronomic optimum. The average level of fertilizer use for this group is modest, 287 kg/ha and their average cereal yield is a modest 3573 kg/ha, as well. The highest yield for this group is 4 tons/ha, twice as high as the highest of the low-fertilizer group.

**Chart 4. Fertilizer Use and Cereal Yields, 42 Low Fertilizer Use Countries, 2007&2008 Data**



Source: World Bank Development Indicators, 2010

**Chart 5. Fertilizer Use and Cereal Yields, 51 Medium Fertilizer Use Countries, 2007&2008 Data**

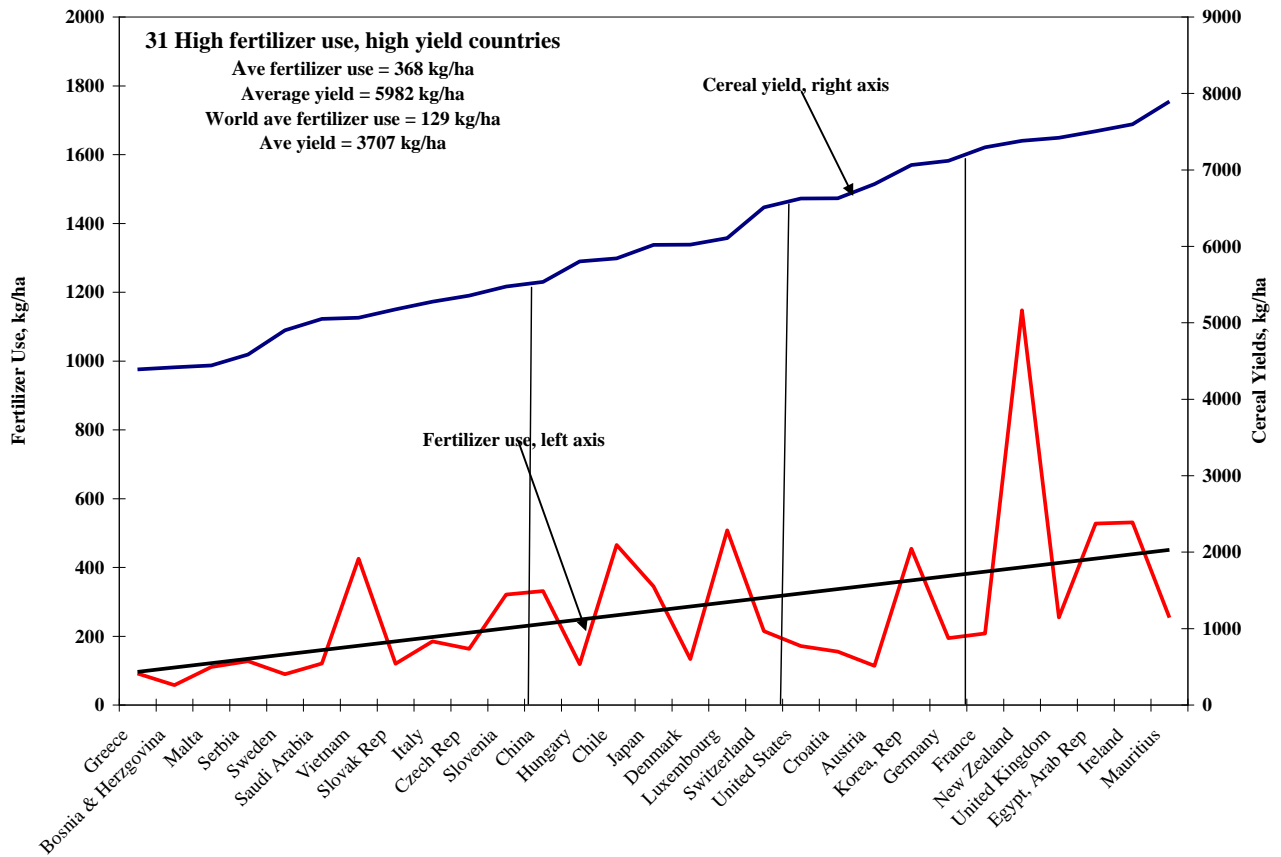


Source: World Bank Development Indicators, 2010

For the third group, fertilizer use is likely established agronomically and matched to generally favorable conditions to produce high yields—for these 31 selected “high producing” countries in 2007-08, the average fertilizer use was 368 kg/ha and the average cereal yield was 5982 kg/ha. For the highest producers, their yields of nearly 8 tons per ha is once again nearly twice as high as in the next lower fertilizer use group. The group is dominated by EU countries, the United States, Japan and China (Chart 6).



**Chart 6. Fertilizer Use and Cereal Yields, 31 High Fertilizer Use Countries, 2007&2008 Data**



Source: World Bank Development Indicators, 2010

Just as cereal yields vary widely among nations, other indicators of development vary widely, as well and they highlight the lack of investment in several key regions.

For example, agricultural worker productivity in high income regions is 28 times as high as for the world average, and 95 times that of workers in low income regions. And, that gap grew during 1990-2005 since productivity per worker in high income regions grew by 60 percent while that in low income countries increased 21 percent (Table 6).

Table 6. Selected Regional Development Indicators

	GDP		Ag Productivity *		
	<i>bil \$</i>	<i>% growth</i>	<i>Ag Value Added/worker</i>		
	<i>2008</i>	<i>2000-08</i>	<i>1990-92</i>	<i>2003-05</i>	<i>% Growth 1990-05</i>
<b>World</b>	60,587	3.2	731	908	24.2
<b>Low Income</b>	569	5.8	222	268	20.7
<b>Middle-Income</b>	16,827	6.4	470	650	38.3
Low MI	8,377	8.3	359	499	39.0
Upper MI	8,445	4.6	1998	2721	36.2
<b>Low &amp; Middle Income</b>	17,408	6.4	432	577	33.6
East Asia and Pacific	5,658	9.1	295	438	48.5
Europe and Central Asia	3,861	6.3	1749	2076	18.7
LA & Caribbean	4,247	3.9	2125	3044	43.2
ME & NA	1,117	4.7	1583	2204	39.2
South Asia	1,532	7.4	335	406	21.2
Sub-Saharan Africa	987	5.2	263	279	6.1
<b>High Income</b>	43,190	2.3	15906	25500	60.3

\* 2000 dollars

Source: World Bank Development Indicators, 2010 report

While productivity per worker is lower in all low and middle income regions than it is in high income regions, that gap in Asia and Sub-Saharan Africa is far wider than in other middle-low income regions (Table 7).

Table 7. Major Development Indicators, Selected Countries and Regions

Selected Nations	Total Wealth <i>\$/capita</i>	Cropland Value		Cereal Yield		Fert Use <i>Kg/ha/arabl.#/100 sq/km</i>	Tractors <i>#/100 sq/km</i>
		<i>Index, World Value=100, %</i>	<i>Index, World Value=100, %</i>	<i>Index, World Value=100, %</i>	<i>Index, World Value=100, %</i>		
Botswana				465	12.5	--	113
Zimbabwe	9,612	350	23.4	309	8.3	34	74
Burkina Faso	5,087	547	36.6	1,035	27.9	--	17
Malawi	5,200	474	31.7	1,599	43.1	34	5
Australia	371,031	4,365	291.8	1,650	44.5	41	71
Zambia	6,564	350	23.4	2,146	57.9	28	11
Madagascar	5,020	955	63.8	2,291	61.8	3	2
India	6,820	1,340	89.6	2,647	71.4	142	199
Thailand	35,854	2,370	158.4	3,014	81.3	117	546
Canada	324,979	2,829	189.1	3,387	91.4	105	163
Mexico	61,872	1,195	79.9	3,454	93.2	66	98
South Africa	59,629	1,238	82.8	3,807	102.7	44	43
Brazil	86,922	1,998	133.6	3,829	103.3	190	131
China	9,387	1,404	93.9	5,535	149.3	331	147
Japan	493,241	710	47.5	6,017	162.3	345	--
United States	512,612	2,752	184.0	6,624	178.7	171	258
Germany	496,447	1,176	78.6	7,119	192.0	194	646
France	468,024	2,747	183.6	7,293	196.7	208	616
<b>World</b>	95,860	1,496	100.0	3,707	100.0	129	195
<b>Low Income</b>	7,532	1,143					
<b>Middle Income</b>	27,616	1,583					
<b>High Income (OECD)</b>	439,063	2,008					

Source: World Bank Development Indicators, 2010 report

Source: World Bank Development Indicators, 2010 Report

For those countries with weak agricultural development and low productivity, the inescapable conclusion is that they are limited by weak links to both resources and markets, and therefore generally lack adequate incentives for investment in productivity and development in other countries. With few exceptions, development institutions recognize that good quality infrastructure is a prerequisite for balanced, robust, economic and social development--services and utilities that include electricity, telecommunications, transport and water supply, among others. The extent to which this is true, and the investment gap required to strengthen this linkage and stimulate investment are discussed in the following section.

### **Infrastructure Investment—a Vital Link.**<sup>13</sup>

The importance of infrastructure and its role in productivity development is widely discussed in development literature.<sup>14</sup> It is clear from this work that all infrastructure is important to market linkages and productivity enhancement, but that roads and electricity often form something of an economic “bottleneck” and therefore are especially important—and, that inadequate infrastructure and related services are main obstacles to investment necessary to accelerate or maintain the pace of development and to achieving the Millennium Development Goals set by the United Nations in 2000 (Table 8).<sup>15</sup>

Also, a large number of economic studies support the conclusion that investment in infrastructure pays very high returns in developing countries (Table 7). These indicate:

- While rates of return on various types of investment in infrastructure vary widely among countries, they are uniformly high for several infrastructure types. For example, for R&D, which likely focuses heavily on farming practices and genetics, returns per unit of investment documented in the IFPRI study below range from 6.75 to 13.45, very high rates of return, indeed.
- For roads and transport, rates of return also are high, although lower than for R&D. They ranged from a low for China of 1.69 to more than 5.3 for India.
- Returns for investment in irrigation range from a low of 0.4 in Vietnam to a high of 1.45 for China. Similarly, rates of return for investments in power varied widely, from 0.26 in India to nearly 4.9 for Thailand.

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<sup>13</sup> See Appendix A—Definition of Infrastructure

<sup>14</sup> For example, in a Woodrow Wilson International Center for Scholars conference in May, 2010, Ann Tutweiler, USDA, told the group that to address the underlying causes of hunger, requires linking farmers to strong markets—that is, building infrastructure. Vivien Foster of the World Bank pointed out that the Sub-Saharan hinterland accounted for 85 percent of crop production, but that only one-third of rural Africa has access to all-season roads. Increasing the rural road network by 500,000 KM would reach 80-percent of high value production, and reduce annual production cost by \$2.5 billion.

<sup>15</sup> A World Bank evaluation of 102 studies of impacts of infrastructure on productivity growth concluded that 100 percent of the studies showed positive effects for infrastructure investment in developing countries. *Infrastructure Services in Developing countries: Access, Quality, Costs and Policy Reform*, Cecilia Briceno-Garmendia, Antonio Estache, and Nemat Shafik, World Bank Policy Working Paper 3468, 2004

**Table 9 Economic Returns from Government Investments in Infrastructure in Asia**

R&D	R&D	Roads	Irrigation	Power
	<i>Unit Output per Unit Input, Local Currency</i>			
India	13.45	5.31	1.36	0.26
China				
Rural Areas	6.75	6.57	1.45	2.89
Ag GDP	6.75	1.69	1.45	0.82
Thailand	12.62	0.86	0.71	4.89
Vietnam	12.22	3.01	0.42	

Source: *Investment Priorities for Hunger and Poverty Reduction in Asia*, Shenggen Fan, IFPRI, ADB, 2007

**Infrastructure Investment Trends.** Infrastructure has traditionally been financed from three main sources, the public sector in each developing country, assistance from developed countries and private investments and gifts. During the 1990s, domestic government or public utilities financed about 70 percent of actual global infrastructure spending from own resources—including cost recovery and subsidies—while official development assistance (ODA) financed 5 to 10 percent and private sources contributed 20 to 25 percent.<sup>16, 17</sup>

In spite of the fact that the importance of infrastructure to economic efficiency is well understood, public investment stagnated more recently in many developing countries where it declined as a share of both total government expenditure and GDP—reflecting in part the perceived need to cut total public expenditure as part of structural adjustment programs, and the fact that the priority attached to infrastructure since the mid-1980s by many governments and donor agencies was eclipsed by even higher priority needs—defense, health, education, among others.

This appears to reflect both lack of resources and expectations that private investment would grow to fill the gap—an expectation that was not met in many cases, especially for sectors like rural roads in many backward and remote areas typically where they have little attraction for private investors.

<sup>16</sup> *Infrastructure and Pro-poor Growth*, Shenggen Fan, IFPRI, 2004

<sup>17</sup> Contrary to common belief, structural adjustment programs have been found to increase the size of government spending, but not all sectors received equal treatment. As a share of total government spending, expenditures on agriculture, education, and infrastructure in Africa; on agricultural and health in Asia; and on education and infrastructure in Latin America, all declined as a result of the structural adjustment programs.

The impact of various types of government spending on economic growth is mixed seen as mixed. In Africa, government spending on agriculture and health was particularly strong in promoting economic growth. Asia's investments in agriculture, education, and defense had positive growth-promoting effects. However, all types of government spending except health were statistically insignificant in Latin America. Structural adjustment programs promoted growth in Asia and Latin America, but not in Africa.

Growth in agricultural production is most crucial for poverty alleviation in rural areas. Agricultural spending, irrigation, education, and roads all contributed strongly to this growth. Disaggregating total agricultural expenditures into research and non-research spending reveals that research had a much larger impact on productivity than non-research spending. *Public spending in developing countries; trends, determination, and impact*, Fan and Rao, IFPRI, 2004

Total government spending on central infrastructure projects (transportation and telecommunication) for 43 developing countries increased very modestly from 1980 to 1998 in constant 1995 prices, but that growth and that of the were more nearly a recovery than a period of net increase.<sup>18</sup>

The primary rationale for structural adjustment programs was to reduce government economic interventions and thereby create an enabling environment for markets to function more efficiently. However, in some cases, very productive sectors in developing countries suffered decreased spending on agriculture, education, health, and infrastructure, especially. In 43 countries<sup>19</sup>:

- Infrastructure spending declined from 2.1% of total GDP in 1980, to 0.86% in 1990 and to 0.81% in 1998.
- For Africa, infrastructure spending as a share of GDP dropped from 1.86 to 1.1 between 1980 and 1998.
- For Asia, it dropped from 2.2 percent to less than one percent, partly reflecting privatization of many formerly state-owned enterprises in the transportation sector.
- Latin America reduced its infrastructure expenditure from 1.92 percent of GDP in 1980 to 0.9 percent in 1998.

Compared to other types of spending priorities, infrastructure investment frequently ranks relatively low. For example, the top three expenditures items for Africa in 1998 were education, defense, and health, with defense accounting for 10 percent of total government spending in 1998 compared to 4% for infrastructure. Infrastructure's share also declined from 6% in 1980 to 4% in 1998. In Asia, infrastructure's share dropped more than half, from 12 percent in 1980 to 5 percent in 1998. In Latin America, the share declined from 11 percent to 6 percent over the same period.<sup>20</sup>

As a result, rural facilities including roads in many developing countries deteriorated sharply. For example in China, while high quality urban roads have increased “exponentially” for the last two decades (by 44% per annum between 1988 and 2002 for expressways), there has been hardly any improvement in rural roads. In fact, the length of rural roads (sub-standard) declined by more than 1% per annum between 1980 and 2002, and thousands of villages do not have proper access to roads, most of which are located in the western regions.

The situation in Sub-Sahara Africa is seen as even more difficult. For example, the World Bank estimates that the average road density in rural areas for the continent is 34 m/km<sup>2</sup>, only 23% of the density in China and 4% of the density in India. Poor road access leads to much higher transaction costs for farmers' produce and discourages

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<sup>18</sup> *ibid.*

<sup>19</sup> *ibid.*

<sup>20</sup> *ibid.*

investment—for example, transaction costs in Kenyan areas where roads are poor are estimated to be equivalent to a value added tax of 15 percent. Transportation charges in rural Ghana and Zimbabwe are estimated to be 2-2.5 times higher than in Thailand, Pakistan, and Sri Lanka.

The economic literature also suggests that while the public sector has traditionally been the dominant supplier of infrastructure services in most countries, inefficiencies in these systems are widespread and arise from endemic problems with poor staff incentives and a lack of financial autonomy, accountability and transparency. Thus, in many cases, privatization is looked to as an effective way to improve efficiency, since private firms have a stronger incentive to build and run these industries in cost effective ways, and to be more responsive to the end user needs.

Privatization also encourages and facilitates the imposition of cost-covering tariffs thus addressing the problems of under pricing that have afflicted many publicly provided infrastructure services. Greater efficiency and cost recovery allows firms to make investments and provide services that might not otherwise have been possible and can both improve efficiency and the government's fiscal condition by making available the same quality and quantity of service with smaller budgetary subsidies.<sup>21</sup>

**Private Investment Trends.** Since the 1980s, many governments have significantly increased involvement of the private sector – including transnational corporations and other players – in their infrastructure financing, investment, ownership and management.<sup>22 23</sup> These shifts involved a series of reforms, such as enterprise restructuring, market liberalization and regulatory changes. Today, the private sector is a significant participant in many infrastructure industries globally, in countries of all political hues, and its role is widely seen as likely to increase further because of the huge investment, technology, skills and management needs in developed and developing countries alike.

A variety of experiences also marked a second wave of liberalizations in the 1990s, as countries in Africa, Asia, Latin America and the Caribbean, and South-East Europe and CIS reformed their infrastructure industries. Many of these countries opted for market liberalization through divestitures of State assets and other forms of private participation,

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<sup>21</sup> Privatization requires “unbundling” in many cases, and the consideration of both the efficiency and equity implications of decision about what and how to privatize are often difficult and controversial. Unbundling is the separation of different activities, such as service generation, distribution and retailing is a necessary part of privatization and involves identifying activities that can be subjected to competition. In unbundled industries, competition and regulation become complements rather than substitutes. E.g., electric power may be most efficiently provided when generation, transmission and distribution are separated, since electricity transmission is a natural monopoly but electricity generation and distribution can be provided competitively. Source: *Infrastructure and Pro-poor Growth*, Shenggen Fan, IFPRI, 2004

<sup>22</sup> UN, FAO, *World Investment Report, 2008* This report has a special, very extensive section of the evolution of investments by international corporations in infrastructure.

<sup>23</sup> *Ibid.*

including the involvement of TNCs, many of which had been established in the first wave of liberalizations.<sup>24</sup>

Other developing countries took different approaches, for instance by choosing a strategy based on the corporatization of state owned enterprises as the central or major plank of their infrastructure reforms. However, such an approach is generally feasible only in countries that have (a) relatively good state-owned infrastructure facilities that can be restructured and are able to absorb new technologies and skills; (b) the funds necessary for restructuring; and (c) effective planning processes able to formulate and realize a long-term vision. Because of this, only a limited number of countries have taken this approach, such as China, Singapore and South Africa.

New players have emerged in infrastructure industries in many countries, both as operators and financiers, following the reduced or altered role of the state in infrastructure investment and operations. Some of these new operators – both SOEs and private firms – established mainly since the 1980s, have evolved into trans-national corporations in their own right. In addition companies in infrastructure-related industries, such as machinery suppliers or construction companies.

The function of integrating complex projects is becoming increasingly important because of their number, scale and scope, and because developing countries are trying to leapfrog stages of infrastructural development. Newer infrastructure TNCs are joining existing ones as leaders of consortiums and similar integrative activities. Since other firms and organizations possess the skills to manage large and complex projects, some of them, such as private equity funds, sensing profitable opportunities, are also becoming significant players.

The new financiers now often provide as much as 20-30% of project finance in infrastructure, but are a heterogeneous set of institutions which belong to two broad categories. The first group are private equity investors attracted specifically by opportunities in infrastructure industries, both in their home and foreign markets. This group includes: (i) infrastructure investment funds, (ii) institutional investors, such as pension and mutual funds, and (iii) investment vehicles created by banks or infrastructure companies for the purpose of supporting their project financing or investment activity. For example, in 2007 they raised some \$34 billion of funds for infrastructure investment, and this is set to rise. Several private equity firms are active in infrastructure in a number of developing countries.

The second group of new financiers includes a variety of state-owned or government-linked entities, including sovereign wealth funds, which have arisen mostly in developing countries as a result of trade surpluses in manufactured goods and services (e.g. in China,

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<sup>24</sup> Despite the expansion of the private sector and the emergence of new players as both operators and financiers over the last two decades, the State's role in infrastructure remains critical. The State has always assumed multiple roles in infrastructure industries: as investor, customer, regulator and mediator but is now increasingly involved as regulator and mediator. Source: *UNCTAD, WIR, 2008*

India, Malaysia, the Republic of Korea and Singapore) or in commodities, especially oil (e.g. the Bolivarian Republic of Venezuela, Saudi Arabia and the United Arab Emirates). These new players do not invest exclusively in infrastructure; for strategic reasons, some of them (e.g. infrastructure financiers from China, India and South Africa) also invest to support other activities, including in the extractive industries overseas.

Governments also recognize the crucial role that private operators and financiers play in establishing efficient and effective industries. Governments will continue to experiment with new models of building infrastructure facilities and delivering services, a good example of which is the rise of public-private partnerships (PPPs) in developed countries and, increasingly, in developing ones.

While direct foreign investment in infrastructure has been quite cyclical, it has become increasingly important for developing countries, but less so for those least developed. For example, in its 2008 investment survey, the FAO concludes that during 1990-2006, the stock of foreign direct investment in infrastructure in developing countries increased 29-fold, and was important for most infrastructure industries, though the expansion in water has flattened out since 2000.<sup>25</sup> The provision of good infrastructure, in turn, is a major determinant of inward FDI<sup>26, 27</sup>

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<sup>25</sup> *Ibid.*

<sup>26</sup> Private and foreign investors often are able to enter formerly publicly provided infrastructure services if a given segment is unbundled from the rest of the industry. Unbundling refers to a separation of segments of an industry from each other. Unbundled segments of infrastructure can be owned and/or operated by different enterprises competing with one another. However, network segments retaining the characteristics of a natural monopoly – regardless of whether they are publicly or privately owned – as well as interactions between more competitive and less competitive segments require special attention. If potentially competitive segments are not unbundled, or if the service provider is protected from competitive pressures, it is difficult to create the necessary incentives for cost control, pricing and enhanced performance and, ultimately, investments.

<sup>27</sup> **Stages of industrial development and infrastructure industries.** Since the industrial revolution, today's developed countries have moved from endowed-assets-based industries to knowledge-based ones, as part of the process of economic development. This "ladder of development" reflects a progression of stages:

1. natural-assets-driven (exemplified by apparel in labor-abundant economies and by raw materials and fuels in resource-rich economies);
2. scale-driven resource-processing (steel and basic chemicals);
3. assembly-based (automobiles);
4. R&D-driven (pharmaceuticals and microchips); and
5. information-driven (stage V). At each stage of development, structural upgrading has led to different types of infrastructure to support the needs of the economy and society.

Today, a number of developing countries are going through similar stages of development, sometimes simultaneously, since these stages can be combined or leapfrogged (e.g. the move to mobile telephony in countries where the cost of fixed-line telephony is prohibitive), and TNCs have actively assisted developing host countries to improve and build up their infrastructure facilities and services in this process—although infrastructure TNCs often contribute to closing the gap between developed and developing countries somewhat unevenly, and may generate another new gap within host countries, between the modern infrastructure provided by the TNCs in particular (notably in high-tech areas), and the still underdeveloped infrastructure in others.

By time-compressing the catch-up process, various forms of infrastructure development which used to be related to the stage of a country's industrial development can now be built simultaneously as



However, the agency also concluded that foreign investment, "...is still small compared to the overall investment needs, especially in the least developed countries that need it most."<sup>28</sup> Additionally, the needs in these countries are more basic and offer little prospect of revenues to attract investors, especially for projects important to agriculture such as farm-to-market rural roads, storage facilities to reduce post-harvest losses that often exceed 30 percent, for flood control, land leveling, ports, bridges and other basic facilities. The agency concluded that investment in these countries accounted for about 2% of the stock of infrastructure-related direct foreign investment in developing countries in 2006.

Given the scale of developing country needs, and the importance of improving their productivity, it is clear that private investment alone cannot be relied upon alone to close the infrastructure financing gap. This will require very significant amounts of capital that can only be provided by coordinated efforts by developed countries.

### The Infrastructure Gap

The future investment needs of developing countries for infrastructure development far exceed the amounts currently planned by governments, the private sector and other stakeholders and has created a growing gap. Indeed, such investment needs are growing with increasing population, rapid economic growth and urbanization, among others, and finding the necessary funds remains a major challenge for most developing countries. However, accurate estimates of infrastructure investment needs and financing gaps are difficult to obtain, and there are a number of competing estimates in the literature.

**Africa.** In recent years, Africa has benefitted from significant improvements in infrastructure. For example, more than 50 percent of Africa's population lived in range of a GSM mobile phone signal in 2006.<sup>29</sup> Five countries have already met the millennium

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successful latecomers telescope (and even strategically reassemble) the stages of economic development in catching up with, and thereby joining the ranks of, developed economies. Source, *UNCTAD WIR, 2008*

<sup>28</sup> FAO's 2008 survey observes that, "Until 2000, Latin America had the largest amount of international corporate involvement, both in absolute and proportional terms, but following a sharp decline there, Asia now has the highest in absolute terms. Corporate involvement in Africa has been significant in transport and telecommunications, but less so in electricity and water."

Overall, allowing for data limitations, Asia accounted for about 47% of the total stock of infrastructure foreign direct investment in developing countries in 2006, with Latin America and the Caribbean accounting for 46% and Africa for about 7%.

<sup>29</sup> *Africa's Infrastructure: A Time for Transformation* highlights the results of the Africa Infrastructure Country Diagnostic (AICD) prepared by a partnership of institutions including the African Union Commission, African Development Bank, Development Bank of Southern Africa, Infrastructure Consortium for Africa, the New Partnership for Africa's Development, and the World Bank. The study involved surveys were conducted among 16 rail operators, 20 road entities, 30 power utilities, 30 ports, 60 airports, 80 water utilities, and over 100 ICT operators, as well as the relevant ministries in 24 countries. The results were based on detailed analysis of spending needs (based on country-level microeconomic models), fiscal costs (which involved collecting and analysis of new data) and sector performance benchmarks (covering operational and financial aspects as well as the country's institutional framework).

targets for universal water access and 12 others are on-track to do so—and, perhaps around 80 percent of Africa’s main road network is in good or fair condition.

For example, a recent World Bank study of infrastructure problems found daunting challenges.<sup>30</sup> Only one in three rural Africans has access to an all-season road and more than 20 percent of the population in Cameroon, Ghana, Mauritania, Niger, and Tanzania must travel more than two kilometers to their primary water supply. In addition, African consumers pay twice as much for basic services as people elsewhere in the world and a monthly basket of prepaid mobile telephone services costs \$12 in Africa but only \$2 in South Asia. The study concludes that the poor state of infrastructure in Sub-Saharan Africa—its electricity, water, roads and information and communications technology (ICT)—cuts national economic growth by two percentage points every year and reduces productivity by as much as 40 percent.

To close the infrastructure gap with other parts of the world, meet the Millennium Development Goals, and achieve national development targets in Africa within 10 years, the Bank concludes that annual spending of \$93 billion would be required—more than double what was originally thought.

The study’s conclusion regarding infrastructure needs is dramatic, especially considering the burdens faced by fragile states. To catch-up on infrastructure needs over the next decade, these countries would need to devote more than a third of their GDP, an extremely difficult goal since the countries with the greatest infrastructure needs are often those that are least attractive to investors. The global financial crisis further underscores the need for a massive effort to overhaul Africa’s infrastructure.

The Bank concludes that access to energy is especially critical for economic growth and poverty alleviation, and that no country in the world has developed its economy without abundant energy supplies. However, chronic power shortages plague 30 African countries and only one in four Africans has access to electricity. The entire installed generation capacity of 48 Sub Saharan African countries is 68 gigawatts, no more than Spain’s. Outside of South Africa, power consumption is barely one percent of the level in high income countries.

The report estimates that of the \$93 billion needed to improve Africa’s infrastructure, almost half is needed to improve its power supply, and that investment needed to support this new power generation capacity are seven times the annual average of the last decade. In addition, the existing capacity also needs refurbishment because a quarter of Africa’s installed power generation capacity is not operational.

Improving the operating efficiency of power utilities through institutional reforms would save Africa \$2.7 billion a year—a significant contribution since less than 90 percent of charges billed to customers in countries covered by the report are actually collected by

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<sup>30</sup> The study concludes that this estimate is still short of what China allocated to infrastructure during the last 20 years, considering only capital investment that was the equivalent to 15 percent of its GDP.

utilities, compared with 100 percent for a well-run utility. For example, in Burkina Faso, Ghana, Niger, or Uganda, uncollected power bills are as large as one percent of the GDP. While improving maintenance of power is key for increasing access for Africans, regional trade is another important piece in the puzzle of lowering costs for African consumers. The study finds that regional power trade could save Africa US\$2 billion per year in energy costs.

The Bank estimates that African countries spend \$45 billion annually year on infrastructure, mainly from domestic sources—but, that this is inefficient because infrastructure providers waste \$8 billion a year on excessive staffing, distribution losses, undercollecting revenue and inadequate maintenance—and are unable to collect some \$2.4 billion a year of services billed. More efficient use of existing resources could release an additional \$17.4 billion for infrastructure every year. However, even after the full potential of efficiency gains are realized, a substantial funding gap of US\$31 billion will remain, particularly for water and power infrastructure in fragile states.

Closing this infrastructure funding gap is seen as a challenge to African countries and the international investment community. External finance for Africa's infrastructure was buoyant in the years leading up to the global financial crisis, swelling from \$4 billion in 2002 to \$20 billion in 2007. Domestic finance in many countries during the same period benefitted from the growth and high prices of natural resources.

However, the current global financial crisis is arresting that growth, reducing the funds available for infrastructure and checking the demand for infrastructure services. To close the funding gap, the study concludes that a combination of resources will be needed, including public budgets, resource rents, local capital markets, private sector and non-OECD finance, as well as traditional donor assistance.

**Asia & Oceania.** The investment needs and financing gap of the *Asia and Oceania* region is also large, especially when considering the significant investment requirements of China and India. The UN Economic and Social Commission for Asia and the Pacific calculated that over the period 2006–2010, the region would need to invest some \$608 billion annually in infrastructure development, while the actual annual investment in recent years has been only \$388 billion – generating an estimated investment shortfall of \$220 billion.

The case of India illustrates some of the financing challenges facing the Asia and Oceania region (Table 8). Over the period 2007–2012, India will need investment averaging \$99 billion per annum in 10 major infrastructure segments, to support a planned annual GDP growth of 9%. The public sector was expected to provide 70% of this investment, and the private sector the rest. Moreover, the private sector is expected to take the lead in financing some infrastructure such as telecommunications, ports and airports—but, these ambitious plans face the same financing gaps as those of the preceding periods: over the period 2001–2010, for instance, the annual financing gap is estimated at close to \$14 billion. UNCTAD concludes that FDI has played only a very small role in the overall financing of that infrastructure, since between April 2000 and February 2008, India

attracted an average of only \$1.3 billion of FDI per annum in electricity, roads, telecommunications, ports, railways and airports (Table 10).

**Table 10. India's Infrastructure Spending Needs, Annual Average**

	World Bank Est FY 2001-10		Government of India		
	<i>Needs</i>	<i>Gap</i>	<i>Needs</i>	<i>Needs</i>	<i>Actual FDI</i>
Energy	26.5	8.7	14.2	30	0.2
Roads	11.6	2.8	7	15.2	0.4
Telecom	5.4	1.2	6	13	0.5
Ports	0.8	0.6	0.2	3.6	0.1
Railways	3.1	0.4	5.8	12.6	0.1
Airports	0.5	0.2	0.4	1.6	0
Other	0	0	9.4	22.8	0
Total, all sectors	47.9	13.9	43	98.8	1.3

*UNCTAD, 2008--World Investment Report*

*In Latin America and the Caribbean*, the financing gap also remains large:

- The region currently spends on average less than 2% of GDP on infrastructure annually, while some 3–6% of GDP is required.
- Public sector investment in infrastructure in the region has fallen considerably, in part due to macroeconomic crises, but also because some governments cut public investment in response to a shift towards giving the private sector responsibility for infrastructure financing and management.
- UNCTAD concludes that while private investment in infrastructure in the region has increased, that growth has not been enough to fill the gap in financing; and it has been unequally distributed across industries as well as by countries.<sup>31</sup>

UNCTAD concludes that the national and regional infrastructure investment gaps extend across all infrastructure activities. A leading example of this gap is in electricity, given the scale of power blackouts in rapidly growing developing economies such as Brazil and South Africa. It has been estimated that during this decade, to 2010, developing countries need to invest \$160 billion annually in electricity generation, transmission and distribution, but so far, only about half of this amount has been forthcoming.

Consequently, blackouts and limited access to electricity likely will hamper future economic growth and achievement of the MDGs unless further investment is found, a

<sup>31</sup> Regional integration in Asia and Oceania, Africa and Latin America and the Caribbean is also accentuating regional infrastructure development and cooperation in transport, energy grids, ports and airports. Physical infrastructure connectivity is important to support regional integration, which in turn is crucial for facilitating intraregional trade, production and investment. This form of South-South regional cooperation is helping to boost economic development in the respective regions. The investment needs of these projects are also significant, although in some cases intraregional infrastructure activity can help bridge overall financing gaps in countries through a sharing of development costs or exploiting economies of scale and scope. *Ibid.*

situation made more difficult by the fact that annual investment needs in the industry will rise further to \$250 billion in the period up to 2030. The investment gap is also large in other infrastructure industries, with the possible exception of telecommunications, in which costs are falling because of rapid technological progress.

The magnitudes of the infrastructure investment needs of developing countries are huge, and even with identifiable sources of finance the gaps remain enormous. Unless the current level of infrastructure spending in all infrastructure industries is increased to match projected investment needs, developing countries will face a serious challenge in meeting their targets for growth and development. This is particularly true for those countries and regions where public sector budgets are limited, private investment has fallen short of needs, and where ODA support is declining. Governments will have to seek investments from a variety of sources to help fill the financing gap, including official flows – in particular ODA – and private investors, both domestic and foreign.

**IFC and the Current Crisis.** Globally, strong growth was recorded in private sector commitments to infrastructure with more even distribution of investment peaking at \$160 billion in 2007—although this investment was concentrated in competitive markets with opportunities for securing revenues such as power generation and water treatment.<sup>32</sup>

In 2008, the agency concluded that the current financial crisis imperils good infrastructure projects which advance the quest for sustainable economic growth with severe consequences for countries' development agendas as poorer developing countries are being crowded out as private investors focus on the largest emerging markets.

The IFC concludes that roughly \$110 billion worth of new projects (2008 estimate) risk delay or postponement and about \$70 billion worth of existing projects face financing or refinancing risk. It estimates that the need for recapitalization is 5–10 percent. In addition, hedge funds are rapidly scaling back their investments and private equity funds are hoarding capital; Asian and Middle Eastern sovereign wealth funds may divert more of their portfolios to their regions. At the same time, investors are demanding higher returns for a given level of risk .

In response, IFC established an Infrastructure Crisis Facility to bridge the gap in available financing for viable, privately-funded or public private partnership infrastructure projects in emerging markets that are facing financial distress as a result of the financial crisis. The Facility also aims to ensure a minimum level of continued new project activity in a sector where restarting project development plans could take several years. The governance structure of the Facility comprises a matching trust, an independent equity fund and an enhancement of existing advisory services in the World Bank Group.

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<sup>32</sup> IFC Issue Brief: Infrastructure Crisis Facility, International Finance Corporation, 2008. The facility estimated that emerging market infrastructure's long-term financing needs are very significant, estimated to be \$21 trillion for 2008-2017.

The Facility includes a loan financing trust, an equity facility, and an advisory facility, providing short-to medium-term financing for infrastructure projects. The IFC will support this effort with up to \$300 million to the Infrastructure Crisis Facility (for the proposed equity fund) and expects other sources to invest an additional \$1.2–10 billion.

### III. Current Sources of Investment Capital for Developing Countries

This section focuses on the several sources of investment flows into the rural sectors of the developing world now, and those planned for the near-term future, with emphasis on development assistance programs.

These investments include a large number of purposes. The Organization for Economic Cooperation and Development tracks both concessional and non-concessional investment in developing countries.<sup>33</sup> Developing country ODA disbursements increased from \$79.4 billion in 2004 to \$128.6 billion in 2008.<sup>34</sup> Non-Development Assistance Countries and multilateral donors (Table 11.)

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<sup>33</sup> In OECD terminology, Official Development Assistance, ODA, includes grants or loans to countries and territories on the DAC List of ODA Recipients (developing countries) and to multilateral agencies which are: (a) undertaken by the official sector; (b) with promotion of economic development and welfare as the main objective; (c) at concessional financial terms (if a loan, having a grant element of at least 25 per cent). In addition to financial flows, technical co-operation is included in aid. Grants, loans and credits for military purposes are excluded. Transfer payments to private individuals (e.g. pensions, reparations or insurance payouts) are in general not counted.

<sup>34</sup> **OECD's Development Assistance Committee** The DAC works to promote policy coherence, which OECD defines as "working to ensure that the objectives and results of a government's development policy are not undermined by other policies of that same government which impact on developing countries, and that these other policies support development objectives where feasible."

The Committee attempts to develop a global partnership for development and to agree to targets on trade, debt, and aid. Coherence is promoted at several levels: *a*) at the internal level within development co-operation policies; *b*) at the intra-country level, meaning consistency between aid and non-aid policies; *c*) at the inter-donor level, meaning consistency between aid and non-aid policies across OECD countries; and *d*) at the donor-recipient level, to achieve shared development objectives. See Appendix B for a list of DAC members and dates of membership.

**Table 11. DAC Country Donors to Developing Countries, 1970-08**

	1970-79	1980-89	1990-99	2000-08	3-decade Change, %
	<i>US dollars, 2007 prices and exchange rates</i>				
Australia	1,217	1,219	1,278	1,757	44
Austria	141	389	303	843	498
Belgium	801	862	716	1,268	58
Canada	1,612	2,144	2,342	2,627	63
Denmark	434	780	1,293	1,614	272
Finland	67	331	403	486	625
France	4,213	6,690	7,936	6,459	53
Germany	3,709	5,479	5,554	6,239	68
Grece			32	224	--
Ireland	8	47	133	552	6800
Italy	367	2,343	2,062	1,456	297
Japan	3,180	5,574	7,673	6,870	116
Luxembourg			73	218	--
Netherlands	1,605	2,765	3,061	4,096	155
New Zealand	145	141	147	211	46
Norway	411	1,070	1,666	2,285	456
Portugal		45	293	374	--
Spain		414	1,381	2,339	--
Sweden	864	1,455	1,695	2,474	186
Switzerland	245	602	866	1,201	390
United Kingdom	3,474	2,931	3,016	6,465	86
United States	9,649	10,905	9,429	17,345	80
<b>Total DAC</b>	<b>32,142</b>	<b>46,186</b>	<b>51,352</b>	<b>67,403</b>	<b>110</b>
EU Institutions	2,294	3,889	6,386	9,874	330

Source: DAC Statistics, OECD, 2010

Other, non-DAC aid contributions also are tracked by OECD, and have become quite significant in recent years, increasing from \$978 million in 1998 to more than \$9.2 billion in 2008 (Table 12). Saudi Arabia, with \$5.6 billion of that amount is the most significant non-DAC donor, by far.

**Table 12. Non-DAC Aid Donor Contributions, 1998-08**

	1998	2000	2005	2006	2007	2008
Chinese Taipei			483.0	513.0	514.0	435.2
Cyprus			15.2	26.0	34.9	37.4
Czech Republic	16.2	16.2	135.1	160.9	178.9	249.2
Estonia	0.2	0.5	9.5	14.1	16.2	22.0
Hungary			100.3	149.5	103.5	106.9
Iceland	7.2	8.6	27.2	41.5	48.2	48.4
Israel	87.1	164.4	95.4	89.9	111.0	137.9
Korea*	182.7	212.1	752.3	455.3	696.1	802.3
Kuwait	278.2	165.0	218.5	158.0	110.1	283.2
Latvia			10.7	11.9	15.9	21.9
Lichtenstein					19.7	23.3
Lithuania			15.6	25.0	47.6	47.9
Poland	18.7	28.8	204.8	296.8	362.8	372.4
Romania						122.9
Saudia Arabia	272.0	295.3	1004.8	2094.7	2078.7	5564.1
Slovak Republic		5.9	56.1	55.1	67.2	91.9
Slovenia			34.7	44.0	54.1	67.6
Thnailand				73.7	67.0	178.5
Turkey	68.8	81.9	601.0	714.2	602.2	780.4
UAE	63.4	149.9	141.3	218.8	429.4	88.1
<b>Total</b>	<b>978.2</b>	<b>1112.3</b>	<b>3770.3</b>	<b>4981.4</b>	<b>5378.7</b>	<b>9232.1</b>

.. Data not reported.

\* Korea has acceded to the DAC with Membership effective 01 January 2010.

Source: OECD/DAC Statistics

**Table 13. Multilateral Donors, Top Ten and Others, 2006-08**

	2006	2007	2008
	<i>US dollars, net distributions</i>		
EU Institutions	9,699	11,327	14,428
International Development Association	5,996	7,463	6,689
Global Fund	1,252	1,627	2,168
AIDF	1,541	1,209	1,625
AsDF	1,020	1,182	1,654
UNICEF	736	981	984
EDF	557	1,062	814
UNRWA	600	700	807
GAVI		923	736
UNTA	371	462	645
Other Multilaterals	3,022	2,583	3,307
<b>Total</b>	<b>24,794</b>	<b>29,519</b>	<b>33,857</b>

Source: *OECD Aid Statistics, 2010*

The top-ten bilateral and multilateral donors accounted for 70 percent of the total in 2008, with the United States and the EU institutions accounting for 30 percent. By contrast, the top-ten recipient developing countries accounted for only 30 percent of the total, with the balance spread among remaining countries (Table 13).



**Table 14. Top Bilateral and Multilateral Donors and Recipients, 2008**

Donors	2008		Recipients	2008	
	mil US \$	Share %		mil US \$	Share %
United States	23860	19	Iraq	9870	8
EU Institutions	14428	11	Afghanistan	4856	4
Germany	9063	7	Ethiopia	3327	3
United Kingdom	7367	6	Palestinian Adm Areas	2593	2
Japan	6823	5	Viet Nam	2552	2
IDA	6689	5	Sudan	2384	2
France	6461	5	Tanzania	2331	2
Saudi Arabia	5544	4	India	2108	2
Netherlands	5200	4	Bangladesh	2061	2
Spain	4802	4	Turkey	2024	2
Other donors	38373	30	Other Recipients	94494	73
<b>Total</b>	<b>128610</b>	<b>100</b>		<b>128600</b>	<b>100</b>

Source: OECD Aid Statistics, 2010

### Where Aid Goes

OECD reports that the \$128.6 billion in ODA in 2008 went primarily to Africa and Asia—each with just over one-third of the total. Least developed countries and lower middle income countries received more than half of ODA, with nearly 30 percent going to LDCs (Table 15).

**Table 15. Net ODA Receipts by Developing countries, 2004-07**

	Net ODA Receipts (USD million)					Share of Receipts %	Population 2008 million
	2004	2005	2006	2007	2008		
North of Sahara, Total	3 060	2 583	2 739	3 190	3 690	2.9	163.73
South of Sahara, Total	26 043	32 194	39 919	34 478	38 993	30.3	819.47
<b>AFRICA, TOTAL</b>	<b>29 710</b>	<b>35 507</b>	<b>43 502</b>	<b>39 122</b>	<b>44 005</b>	<b>34.2</b>	<b>983.20</b>
North & Central America, Total	3 398	3 284	3 487	3 484	4 311	3.4	183.11
South America, Total	2 942	2 839	3 300	2 910	3 722	2.9	383.92
<b>AMERICA, TOTAL</b>	<b>6 803</b>	<b>6 706</b>	<b>7 308</b>	<b>6 954</b>	<b>9 262</b>	<b>7.2</b>	<b>567.03</b>
Middle East, Total	7 503	24 893	14 147	14 259	19 845	15.4	( 158.34)
South and Central Asia, Total	9 094	11 388	11 344	13 046	15 959	12.4	(1 641.18)
Far East Asia, Total	6 001	8 364	6 518	7 310	7 049	5.5	1 873.33
<b>ASIA, TOTAL</b>	<b>22 881</b>	<b>45 575</b>	<b>32 930</b>	<b>35 607</b>	<b>44 159</b>	<b>34.3</b>	<b>(3 672.85)</b>
<b>EUROPE, TOTAL</b>	<b>3 603</b>	<b>4 044</b>	<b>5 035</b>	<b>4 187</b>	<b>6 570</b>	<b>5.1</b>	<b>154.83</b>
<b>OCEANIA, TOTAL</b>	<b>939</b>	<b>1 161</b>	<b>1 199</b>	<b>1 309</b>	<b>1 535</b>	<b>1.2</b>	<b>( 8.65)</b>
<b>Developing countries, TOTAL</b>	<b>79 399</b>	<b>107 975</b>	<b>106 149</b>	<b>107 102</b>	<b>128 608</b>	<b>100.0</b>	<b>(5 386.56)</b>
<i>By Income Group (f)</i>							
LDCs	25 266	25 757	28 053	32 815	38 427	29.9	( 787.96)
Other LICs	7 456	13 326	19 090	10 927	10 622	8.3	( 568.24)
LMICs	21 563	43 269	28 883	28 977	32 226	25.1	(3 387.44)
UMICs	4 421	4 438	6 122	6 143	9 571	7.4	( 617.48)

a) ODA receipts are total net ODA flows from DAC countries, multilateral organisations, and non-DAC countries

b) This country left the DAC List of ODA Recipients on 1 January 2005.

c) These countries joined the DAC List of ODA Recipients on 1 January 2005.

d) These countries left the DAC List of ODA Recipients on 1 January 2008.

e) World Bank Atlas basis.

Source: World Bank, Secretariat estimates. Group totals and averages are calculated on available data only.

Table 16. ODA Disbursements By Sector

	Bi-lateral		Multi-lateral		Total	
	Share %	bil US \$	Share, %	bil US \$	Share, %	bil US \$
Social	40.2	34.8	39.8	13.5	40.1	48.2
Water & Sanitation	4.9	4.2	4.3	1.5	4.7	5.7
Economic	16.7	14.4	23.2	7.9	18.5	22.3
Transport	7.7	6.7	13.9	4.7	9.4	11.4
Production	6.9	6.0	9.1	3.1	7.5	9.0
Ag, Forestry, Fishing	4.6	4.0	6	2.0	5.0	6.0
Multisector	6.9	6.0	7.9	2.7	7.2	8.6
General	5.1	4.4	11.2	3.8	6.8	8.2
Debt	8.4	7.3	0.3	0.1	6.1	7.4
Humanitarian	7.4	6.4	4.9	1.7	6.7	8.1
Others	8.5	7.3	3.8	1.3	7.2	8.6
Total	100	86.5	100	33.9	100.0	120.3
Food and Emergency	3.8	3.3	2.5	0.8	3.4	4.1

Source: OECD Developing Country Aid Statistics, 2010

**Agricultural Aid.** While global commitments to developing country aid now approach \$150 billion annually, OECD notes that in 2007-08, total annual average aid commitments to agriculture have been a small, often declining share of that amount. In 2007-08, direct aid for agriculture amounted to \$7.2 billion, primarily from a few DAC members including the United States (average \$1.4 billion annually), Japan (\$1 billion) and France (\$582 million) (Table 17). However, it also observes that since the mid 1980s, aid to agriculture has fallen by 43 percent, although recent data indicate a slowdown in that decline and the beginnings of an upward trend. On the multilateral side, IDA is the predominant agency, its flows accounting for 50% of total multilateral aid to agriculture in 2007-08.

**Table 17. Aid to Agriculture, by Donor, 203-08<sup>35</sup>**

<i>Ann Ave Commitments &amp; Disbursements, Disbursements, Constant 2007 prices, mil US dollars</i>			
	<b>2003-04</b>	<b>2005-06</b>	<b>2007-08</b>
United States	379	722	1397
Japan	609	755	991
France	235	191	582
United Kingdom	164	180	239
Germany	204	323	228
Spain	131	113	211
Canada	232	149	169
Norway	98	116	139
Australia	78	112	110
Belgium	81	91	106
Netherlands	203	154	99
Switzerland	70	65	85
Sweden	72	114	83
Denmark	89	171	67
Finland	23	44	61
Italy	39	28	60
Ireland	25	24	45
Luxembourg	11	6	14
Austria	7	11	12
New Zealand	6	14	8
Greece	2	2	5
Portugal	4	3	2
<b>Total DAC</b>	<b>2762</b>	<b>3388</b>	<b>4713</b>
IDA	963	756	1261
EC	365	334	539
IFAD	136	168	262
FAO	211	211	210
AsDF	273	225	120
AfDF	280	249	118
IDB Sp Fund	75	15	10
UNDP	5	3	1
<b>Total Multi-Latera</b>	<b>2308</b>	<b>1961</b>	<b>2521</b>
<b>Total</b>	<b>5070</b>	<b>5349</b>	<b>7234</b>

*Source: Measuring Aid to Agriculture, OECD, DAC, April, 2010*

Since total aid has increased substantially in recent years, the share of aid to agriculture has declined even faster than its real dollar amount. OECD concludes that this reveals a clear relative neglect of the agriculture sector. Still, a number of individual donors

<sup>35</sup> OECD observes that general budget support, once integrated in developing countries' domestic budgets, may contribute to the development of the agricultural sector, but this contribution is not specified and not taken into account in the above figures.

Korea became a DAC member on 1 January 2010, but is not included in the figures in this table. Aid to agriculture by Korea amounted to USD 82 million in 2007-08, which represented 7% of its total bilateral sector allocable aid.

The data show that IFAD does not extend the totality of its aid flows for agriculture (53% in 2007-2008). Most of the remaining flows fall under rural development in the DAC sector classification, and are taken into account in a broader measure of aid to agriculture and food security.

extend relatively high proportions of their aid to agricultural projects, including Finland (11%), France and Switzerland (10% each). Belgium and Japan (9% each) also are well above the 6% DAC average for the years 2007-08.

For DAC members (including EU institutions), six of the top ten recipients are in Asia, thanks partly to large Japanese loans to India and China, and to large grants from the United States to Afghanistan (to reduce illicit drug cultivation) and Iraq (to improve agricultural productivity) (Table 18.).

**Table 18. DAC Members Agricultural Aid, 2007-08**  
Main Recipients and Others, Constant US \$

	<i>mil \$</i>	<i>Share, %</i>
Afghanistan	368	7.0
India	322	6.1
Morocco	233	4.4
Ghana	231	4.4
Iraq	155	3.0
Mali	183	3.5
Indonesia	169	3.2
Colombia	109	2.1
China	108	2.1
Vietnam	114	2.2
Other	3260	62.1
Total	5252	100.0

*Source: Measuring Aid to Agriculture, OECD, DAC, April, 2010*

**Loans and grants.** OECD also observes that most bilateral donors now provide aid only in form of grants, although some larger donors also provide soft loans for agriculture, including Japan (\$ 708 million in 2008) and France (\$102 million). Among multilateral agencies, the major loan provider was IDA (\$1 billion in 2008). Overall, 28 percent of aid to agriculture was in loan form in 2008. DAC members' loans went mainly to lower middle income countries (77 percent ) whereas projects in least developed countries were practically all financed through grants.

### **Agriculture and Food-Security-Related Sectors**

The DAC definition of aid to agriculture excludes rural development (which it classified as multi-sector aid), developmental food aid (general program assistance) and emergency food aid (humanitarian assistance). When aid that supports improving rural livelihoods and food security in developing countries, support for agriculture and food security increases to \$12.3 billion per year in 2007-08. OECD observes that, while there is little trend in these data over the most recent years, they so appear to indicate a slight recovery over the late 1990s since bi-lateral aid to agriculture and food security increased from \$5.9 billion in 1996-97 to \$9 billion in 2007-08 (Table 19 ).

**Table 19. Aid to Agriculture and Food-Security-Related Sectors, 2003-08**  
*Average ann Commitments, mil \$, constant 2007 prices*

	Average annual commitments,		
	Constant 2007 \$		
	2003-04	2005-06	2007-08
<b>DAC Countries</b>			
Agriculture/Forestry/Fishing	2763	3388	4713
Rural Development	622	729	776
Development food aid	1358	1053	1204
Emergency food aid	1967	2131	2284
<b>Total DAC Countries</b>	<b>6710</b>	<b>7301</b>	<b>8977</b>
<b>Multi-lateral Agencies</b>			
Agriculture/Forestry/Fishing	2308	1961	2521
Rural Development	253	216	224
Development food aid	823	1159	393
Emergency food aid	109	180	157
<b>Total Multi-lateral agencies</b>	<b>3493</b>	<b>3516</b>	<b>3295</b>
<b>Total</b>	<b>10203</b>	<b>10817</b>	<b>12272</b>

*Source: Measuring Aid to Agriculture, OECD, DAC, April, 2010*

Over the period 2003-08, aid flows to agriculture primarily targeted Sub-Saharan Africa (31%) and South and Central Asia (22%). Least developed countries and other low income countries received more than half of total aid to agriculture.

The trend in aid to the agricultural sector is set by a few large donors (see Table 20), and in 2007-08, more than half of DAC member countries' total bilateral aid commitments to agriculture came from three donors: the United States (30%), Japan (21%) and France (12%). These were also the largest donors on a disbursement basis.

**Table 20. Aid to Agriculture, by Donor, 2003-08<sup>36</sup>**

<i>Ann Ave Commitments &amp; Disbursements, Disbursements, Constant 2007 prices, US dollars</i>			
	<b>2003-04</b>	<b>2005-06</b>	<b>2007-08</b>
United States	379	722	1397
Japan	609	755	991
France	235	191	582
United Kingdom	164	180	239
Germany	204	323	228
Spain	131	113	211
Canada	232	149	169
Norway	98	116	139
Australia	78	112	110
Belgium	81	91	106
Netherlands	203	154	99
Switzerland	70	65	85
Sweden	72	114	83
Denmark	89	171	67
Finland	23	44	61
Italy	39	28	60
Ireland	25	24	45
Luxembourg	11	6	14
Austria	7	11	12
New Zealand	6	14	8
Greece	2	2	5
Portugal	4	3	2
<b>Total DAC</b>	<b>2762</b>	<b>3388</b>	<b>4713</b>
IDA	963	756	1261
EC	365	334	539
IFAD	136	168	262
FAO	211	211	210
AsDF	273	225	120
AfDF	280	249	118
IDB Sp Fund	75	15	10
UNDP	5	3	1
<b>Total Multi-Latera</b>	<b>2308</b>	<b>1961</b>	<b>2521</b>
<b>Total</b>	<b>5070</b>	<b>5349</b>	<b>7234</b>

*Source: Measuring Aid to Agriculture, OECD, DAC, April, 2010*

<sup>36</sup> OECD observes that general budget support, once integrated in developing countries' domestic budgets, may contribute to the development of the agricultural sector, but this contribution is not specified and not taken into account in the above figures.

Korea became a DAC member on 1 January 2010, but is not included in the figures in this table. Aid to agriculture by Korea amounted to USD 82 million in 2007-08, which represented 7% of its total bilateral sector allocable aid.

These data show that IFAD does not extend the totality of its aid flows for agriculture (53% in 2007-2008). Most of the remaining flows fall under rural development in the DAC sector classification, and are taken into account in a broader measure of aid to agriculture and food security.

### US Foreign Assistance Programs, FY 2010 and FY2011

The US Foreign Assistance budget is massive in size—\$32.7 billion in FY2009, and would grow to nearly \$36.4 billion in FY2011 under the administration’s request (See Appendix C for Foreign Assistance “strategic areas”).<sup>37</sup> In terms of major, established programs, detail from the Department of State Budget Request and Justification for “Foreign Operations and Related Accounts” (Summarized in Table ). For example, for FY 2010, estimated actual spending from a number of available sources is:

- USAID, \$1,650.3 million;
- Bilateral Economic Assistance, \$22,552.2 million;
- Independent Development Agencies, including Peace Corps, Millennium Challenge Corp; Inter-American Foundation and the African Development Foundations, \$1,558.0 million;
- Multilateral Economic Assistance, \$2,437.7 million;
- International Financial Institutions: \$2,043.7 million; and
- USDA Food Aid Programs, \$1,889.5 million.

Of particular interest are the administration’s new commitments to global agricultural development and food security, and the increase in resources available for development programs overall.

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<sup>37</sup> In terms of strategic programs, the two largest, “Achieving Peace and Security” and “Investing in People” account for nearly 60 percent of the total. “Promoting Economic Growth and Prosperity” also is a major strategic area and commands about 15 percent of the resources requested, \$5.5 billion. Agriculture accounts for almost a third of that, 5 percent of the total request. Infrastructure accounts for just under one-quarter of the economic growth strategic goal, 4 percent of the total request for FY2011.

**Table 21. Foreign Operations and Related Accounts, FY2009-11**

	<b>FY2009</b>	<b>FY2010 1/</b>	<b>FY2011 ②</b>
		<i>million \$</i>	
<b>US AID</b>	<b>1,258.0</b>	<b>1,650.3</b>	<b>1,695.5</b>
<b>Bi-Lateral Economic Assistance, including:</b>	<b>22,594.4</b>	<b>22,552.2</b>	<b>25,583.3</b>
Global Health and Child Survival	7,339.0	7,779.0	8,513.0
Development Assistance	2,000.0	2,520.0	2,980.9
International Disaster Assistance	820.0	845.0	860.7
Development Credit Authority	(50.0)	(25.0)	(35.0)
DCA Administrative Expense	8.0	8.0	8.3
Economic Support Funds	7,116.9	6,344.0	7,812.0
Democracy Fund	116.0	120.0	
Assistance for Europe, Eurasia and Central Asia	922.0	741.6	716.4
Migration and Refugee Assistance	1,674.5	1,693.0	1,605.4
US Emergency kRefugee and Migration Assistance	40.0	45.0	45.0
International Narcotics Control	1,876.5	1,597.0	2,136.0
Andean Counterdrug Program	(315.0)		
Nonproliferation, Antiterrorism, Demining and Related Programs	631.5	754.0	757.6
<b>Independent Agencies</b>	<b>1,270.0</b>	<b>1,558.0</b>	<b>1,778.6</b>
Peace Corps	340.0	400.0	446.1
Millennium Challenge Corp	875.0	1,105.0	1,279.7
Inter-American Foundation	22.5	23.0	22.7
African Development Foundation	32.5	30.0	30.0
<b>Department of Treasury--Technical Assistance and Debt Restructuring</b>	<b>85.0</b>	<b>85.0</b>	<b>108.0</b>
<b>International Security Assistance--Peacekeeping</b>	<b>7,554.7</b>	<b>4,634.0</b>	<b>7,069.3</b>
<b>Multilateral Economic Assistance</b>	<b>1,845.5</b>	<b>2,437.7</b>	<b>3,037.7</b>
<b>International Financial Institutions</b>	<b>1,493.0</b>	<b>2,043.7</b>	<b>2,957.2</b>
<b>Export and Investment Assistance</b>	<b>(299.2)</b>	<b>(113.9)</b>	<b>(142.6)</b>
<b>Related International Affairs Accounts</b>	<b>76.8</b>	<b>84.0</b>	<b>89.2</b>
<b>Department of Agriculture</b>	<b>2,420.9</b>	<b>1,889.5</b>	<b>1,899.5</b>
Food for Peace, Title II	2,320.9	1,690.0	1,690.0
McGovern-Dole International Food for Education	100.0	199.5	209.5
<b>Total Foreign Operations and Related Accounts</b>	<b>34,308.4</b>	<b>32,803.8</b>	<b>39,399.8</b>

Source: US Department of State, Congressional Budget Justification, FY2011

**Note:** FY2009 Actual includes funding from the Supplemental Appropriations Act, 2008, from the American Recovery and Investment Act of 2009; the Omnibus Appropriations Act, 2009 and the Supplemental Appropriations Act, 2009.

The FY2010 estimate includes funding from the Consolidated Appropriations Act, 2010.

Also, \$1.8 billion in funding from the Supplemental Appropriations Act, 2009, was considered to be forward funding for FY2010. This funding includes GHC, \$50 million; Incle; \$94 million; FMF, \$1.225 million.

Also, the FY2009 USAID capital Investment Fund level includes \$38 million transferred from the Department of State capital Investment Fund under the American Recovery and Reinvestment Act of 2009.

**New Multilateral Commitment.**<sup>38</sup> President Obama made new commitments to global agricultural development and food security at the G8 Summit in L'Aquila, Italy, in 2009 and later reconfirmed these commitments at the G20 meeting in Pittsburgh in September 2009. The G8 summit leaders and other countries and institutions in attendance announced the launch of a new international fund called the Global Partnership for Agriculture and Food Security (*Feed the Future*), which will be administered by the World Bank and has the goal of mobilizing \$20 billion over three years to finance initiatives that will “free mankind from hunger and poverty.”

This program envisions a US contribution of \$3.5 billion over the next three years that would be leveraged to make available some \$20 billion to attack the root causes of global hunger through accelerated agricultural development and improved nutrition. The US

<sup>38</sup> Source: US Dept of State, FY2011 Congressional Budget Justification



commitment is intended to meaningfully accelerate” progress towards the first Millennium Development Goal by reducing the number of people living in extreme poverty and suffering from hunger and malnutrition.

In partnership with other donors and leaders, the President’s “Feed the Future” initiative is designed to work with a set of host countries and other donors both public and private. It includes five key principles:

- **Ensure a comprehensive approach.** Investment in programs that achieve sustainable agricultural productivity, improve access to strong markets, increase incomes so the poor can purchase food, reduce undernutrition and increase effectiveness of emergency humanitarian assistance by strengthening the capacity of countries to anticipate and prevent hunger related emergencies.
- **Invest in country-led plans.** Alignment with countries’ own investment plans and strategies, reflecting broad-based stakeholder engagement and ownership, in order to support result-based programs and long-term sustainable outcomes.
- **Strengthen strategic coordination.** Reinforcement of strategies using both diplomatic and foreign assistance tools to ensure that efforts are coordinated on multiple levels: from community-based to country, regional and global mechanisms.<sup>39</sup>
- **Leverage the benefits of multilateral institutions.** Partnerships with other donors, including non-traditional donors, to leverage additional resources, complement bilateral assistance, facilitate alignment behind country-led plans and reduce process burdens on recipients.
- **Deliver on a sustained and accountable commitment.** Strong commitment to establish a results framework that monitors performance and measures progress towards goals. This will promote a level of mutual accountability among all stakeholders that invest in country-led investment plans, create greater transparency, allow for improved coordination, and result in greater impacts.

To ensure the initiative will have growing and lasting development impacts over time, GHFSI assistance efforts will be focused and concentrated. Assistance in FY 2011 will center on a group of 20 countries that have been identified on the basis of need, growth potential, host government commitment and opportunities for regional synergies through trade and other mechanisms.

The GHFSI will partner with selected countries and other stakeholders to assist host countries in developing and implementing their own Country Investment Plans (CIPs), such as those under the Comprehensive Africa Agriculture Development Program (CAADP). These plans are to be empirically and analytically sound, based on

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<sup>39</sup> Funding for nutrition programs incorporated in the Global Hunger and Food Security Initiative is requested separately in the President’s Budget; it is included in the Global Health Initiative request

transparent and inclusive consensus-building processes, have fully engaged the private sector, civil society and other stakeholders, and take into account the interests of women and other disadvantaged groups. Strategic investments will include efforts to improve agriculture productivity, expand market access of small scale producers, catalyze economic growth, finance and trade, including increasing access to financial services, and other value chain components, and will take place in two phases.

**Phase I:** (\$352 million) Recognizing that each country's development process starts in different places and progresses at different rates, the types and amounts of USG investment will be tailored to each country's unique circumstances. In countries that are in the process of preparing their CIP, assistance includes organization and skills training of key government officials to lead country plan development and implementation, support for stakeholder consultation, public expenditure review and analysis that identifies priority investment opportunities, and identification of needed actions to improve the policy environment – investments all focused on accelerating countries' efforts toward building a conducive environment for successful country plan implementation.

**Phase II:** (\$246 million) Countries demonstrating readiness for large scale investment will have completed a high quality CIP that lays out priority areas, clear costing, projection of financial need, defined targets, desired results and includes beneficiary analysis, gender assessment, technical feasibility evidence and a practical implementation plan, results framework and system to monitor progress. In addition, they will have also made a commitment of their own resources, and have taken critical steps to establish a policy environment that fosters rapid agricultural development and improved nutrition.<sup>40</sup>

The USG budgeted investments made in Phase II are significantly increased, align closely with the CIP, build on the country's own resource commitments plus those of other development partners, and acknowledge access to additional sources of support via multilateral organizations.

Based on countries' progress to date in developing their CIPs and improving their agriculture and nutrition policy environments, the Administration has notionally identified five countries that are projected for a first year of significant investment by the time that FY 2011 funds are made available. Those countries are: Ghana, Mali, Rwanda, Senegal and Tanzania. Progress will continue to be monitored in the coming months to reassess Phase II investment readiness prior to making final FY 2011 allocations. Depending on progress at the country level, it is possible that one or more of the countries notionally identified for Phase II may not be prepared to move forward with these higher-level USG investment levels, or alternatively that one or two other countries may have moved forward more rapidly than expected and be ready for higher levels of investment (e.g., Phase II) earlier.

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<sup>40</sup> In order to assess when a country has established a policy environment that can support effective Phase II investments under the GHFSI, the administrator will develop a set of objective indicators that measure both the progress toward reforms that a country has committed to in its internal consultative processes, and a minimum set of internationally recognized cross-country policy indicators.

**Strategic Reserve:** (\$55 million) Given the nature of a country-led strategy, the possibility of shifts in budget projections will require some flexibility. Accordingly, the GHFSI contains a reserve fund mechanism in the FY2011 budget. In addition to investments in individual countries' national agriculture investment plans, the Administration's comprehensive GHFSI strategy includes global and regional programs that create a catalytic approach in linking the lab, the farm, the market and the table and that increase the impact of investments made in the targeted countries' CIPs more broadly.

**Research and Development (R&D):** (\$145 million) Expanding investment in R&D is intended to establish technologies and public goods that can increase yields with improved seeds and feed, fortify foods to enhance nutrition, and find adaptive agricultural products to climate change – innovations that raise productivity and respond to emerging challenges such as the spread of plant and animal disease and climate change. Given the longer time horizon such investments take to demonstrate impact and the critical role innovative technologies can have on the long-term, sustained results of the initiative, material increases in funding in FY2011 is an urgent priority.

**Monitoring and Evaluation:** (\$14 million) and **Regional Food Security Programs:** (\$130 million).

**Strategic Partner Countries:** (\$45 million) Investments in specific strategic partner countries that will leverage the considerable expertise and influence of government, private sector, and non-governmental partners. These strategic partnership investments generate expanded and shared scientific, technological and educational capacity that yield improvements to Phase I and II countries' farming systems and natural resource management through cooperation on weather and climate information generation, capacity building, transfer of technology in agricultural research and crop production management, agricultural policy dialogue to promote regional market growth and cooperation, and engagement and coalition building that prioritizes nutrition.

**Community Development for Underserved Populations:** (\$75 million) Programs will expand efforts to narrow the gap between humanitarian and development assistance through expanded support for productive rural safety nets, microfinance and savings programs that reduce the vulnerability to short-term production, income, and market disruptions.

**Other Ongoing Agricultural Development Programs:** (\$174 million) This request maintains support for ongoing agricultural development programs in countries other than those targeted for Phase I and II investment in the GHFSI.

**Nutrition:** (\$200 million) FY2011 funding for nutrition programs will be used for both the prevention and treatment of undernutrition.

**Multilateral Programs:** (\$408 million) USG contributions to a new multi-donor Global

Hunger and Food Security Trust Fund, to be managed by the World Bank, will leverage other donor contributions and establish a pool of funding that will complement the bilateral assistance investments budgeted in Phase II countries by supporting large-scale infrastructure investments (e.g. transportation and irrigation), commercial financing, and research and extension.

**Humanitarian Assistance:** In addition to the funds requested for the GHFSI, the Budget provides \$1.69 billion for Food for Peace Title II (formerly P.L. 480 Title II) for emergency and nonemergency food assistance as well as \$300 million in International Disaster Assistance for emergency food assistance interventions such as local and regional procurement, cash vouchers and cash transfers, which allow for greater flexibility and timeliness in delivering food assistance. While these programs are not incorporated within the GHFSI results framework, they will be coordinated with GHFSI programs.

**Table 23. Feed the Future: Global Hunger and Food Security Initiative, FY2011 Funding Request and Ongoing Agricultural Development Programs**

<i>million \$</i>			
<b>Phase I</b>	<b>352.4</b>	<b>Regional Programs</b>	<b>129.5</b>
Bangladesh	30.0	USAID Africa Regional	30.0
Cambodia	15.0	USAID East Africa Regional	30.0
Ethiopia	33.0	USAID LA&C Regional	10.0
Buatemala	24.0	USAID Central American Regional	5.0
Haiti	35.7	USAID Regional Development Mission Asia	5.0
Honduras	20.3	USAID Southern Africa Regional	15.0
Kenya	29.0	USAID West Africa Regional	32.0
Liberia	28.1	USAID Asia and ME Regional	2.0
Malawi	22.8	USAID Central Asia Regional	0.5
Mozambique	14.8	<b>Research and Development</b>	<b>145.0</b>
Nepal	12.0	USAID Economic Growth, Agriculture and Trade	144.7
Nicaragua	16.5	ODP-BIFAD	0.3
Takikistan	11.6	<b>Monitoring and Evaluation</b>	<b>14.0</b>
Uganda	36.7	EGAT	14.0
Zambia	22.8	<b>Community Development</b>	<b>75.0</b>
<b>Phase II</b>	<b>246.0</b>	DCHA/PPM	75.0
Ghana	42.0	<b>Total State/USAID Initiative</b>	<b>1262.2</b>
Mali	47.0	On-going Agricultural Development Programs	173.9
Rwanda	47.0		
Senegal	47.0		
Tanzania	63.0		
<b>Strategic Reserve</b>	<b>55.2</b>		
<b>Strategic Partners</b>	<b>45.0</b>		
Brazil	2.5		
India	15.0		
Nigeria	25.0		
South Africa	2.5		

Source: US Dept of State, FY2011 Congressional Budget Justification

### Millennium Challenge Corporation

The Millennium Challenge Corporation was established by the Millennium Challenge Act of 2003 as a US mechanism for meeting the Millennium Development Goals of the United Nations. The organization administers “targeted foreign assistance,” aimed at helping selected countries improve governance, economic freedom and human capital development. It claims the goal of reducing global poverty through the promotion of sustainable economic growth.

MCC frequently claims a key role as one of the democracy promotion activities of the United States, based on the assumption that strengthening governance and economic institutions is a prerequisite for democracy. And, it also describes its programs as innovative methods to overcome the limitations of some of the lending policies of other organizations such as the World Bank by placing the responsibility for establishing and operating development programs on the recipient country rather than the aid agency.

**Country focus.** Eligible countries are designated as lower middle income countries in the then most recent edition of the World Development Report for Reconstruction and Development published by the International Bank for Reconstruction and Development. They are required to have income levels above the historical ceiling for International Development Association eligibility for the fiscal year involved. In addition, a candidate country must be found by the Corporation Board to have demonstrated a commitment to a series of criteria, including:

- Just and democratic governance, including a demonstrated commitment to:
  - promote political pluralism, equality, and the rule of law;
  - respect human and civil rights, including the rights of people with disabilities;
  - protect private property rights;
  - encourage transparency and accountability of government; and
  - combat corruption;
- Economic freedom, including a demonstrated commitment to economic policies that—
  - encourage citizens and firms to participate in global trade and international capital markets;
  - promote private sector growth and the sustainable management of natural resources; strengthen market forces in the economy; and
  - respect worker rights, including the right to form labor unions; and
- Investments in the human capital of the country, particularly women and children, including programs that
  - promote broad-based primary education; and
  - strengthen and build capacity to provide quality public health and reduce child mortality.

Thus, while the MCC programs extend far beyond agriculture, the organization frequently describes the importance of support for balanced development including

agriculture, an approach emphasizes the extremely complex role that the sector plays in the economy of many developing countries. MCC emphasizes that agriculture can be a source of growth for the national economy, a provider of investment opportunities for the private sector, and a prime driver of agriculture-related industries and the rural non-farm economy.

MCC also frequently emphasizes that, at the household level, agriculture is a source of livelihoods for an estimated 86% of rural people throughout the world. Of the developing world's 5.6 billion people, 3 billion live in rural areas, nearly half of humanity. In MCC's Compact countries to date, some 61% of the population—over 120 million people—live in rural areas.

MCC reports program operations in 38 countries including both “Threshold” programs or investment “Compacts.” These are multi-year activities, and the Compacts are often very significant investments, with the largest for Morocco at \$697 million, followed by Ghana and Guyana at \$547 million. MCC reports that 23 countries have compacts.

For MCC compact countries for which data are available, agriculture generates on average 21% of gross domestic product, employs 59% percent of the labor force, and accounts for 38% of total merchandise exports. Beyond the agricultural sector itself, the industries and services linked to agriculture in value chains account for a significant percentage of GDP even in increasingly urbanized countries (Table 24).<sup>41</sup>

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<sup>41</sup> <http://www.mcc.gov/pages/countries>

**Table 24. MCC Programs, by Country**

	Threshold I	Threshold II	Compact
	<i>million \$</i>		
Morocco			697.5
Ghana			547
Guyana	6.7		547
Mozambique			506.9
Burkina Faso	12.9		480.9
El Salvador			460.9
Mali			460.8
Philippines	207		434
Georgia			395.3
Lesotho			362.6
Benin			307.3
Namiba			304.5
Mongolia			284.9
Jordan	25		275
Moldova	24.7		262
Armenia			235.6
Honduras			205
Nicaragua			174.7
Cape Verde			110.1
Madagascar			109.8
Tanzania	11.1		69.8
Senegal			54
Paraguay	34.6		30.3
Albania	13.8	15.7	
Indonesia	55		
Kenya	12.7		
Kyrgyz	16		
Liberia	15.1		
Malawi	20.9		
Niger	23.1		
Peru	35.6		
Rwanda	24.7		
Sao Tome and P	7.4		
Timor-Leste	10.5		
Uganda	10.4		
Ukraine	45		
Vanatu	65.7		
Zambia	22.7		

Source: <http://www.mcc.gov/pages/countries>

Agricultural programs funded by MCC are designed to contribute to poverty reduction and economic growth by making agriculture more competitive, productive and profitable, leading to higher sales, additional employment opportunities, and improved farm household livelihoods. These programs emphasize different paths of intervention, but often include training and extension to farmers and/or agribusinesses, increased access to inputs, such as improved seeds, fertilizers, or veterinary services, and support to farmers' associations as a vehicle for greater market participation. Some programs focus on

traditional crops and livestock, while others seek to offer incentives to switch to alternative, higher value production.

A major challenge for the Corporation and its programs is to create sufficient incentives, not only to improve the welfare of beneficiary farm households, but also to trigger sustainable growth. In countries where MCC intervenes, agricultural sectors are typically characterized by a large number of relatively inefficient small producers of similar crops or livestock and with limited market power. Farmers in target countries also have limited access to capital and often have large discount rates against future benefits in part because household production and consumption are closely tied.

Because of the complexity of the development challenge for agricultural sector in lower income developing countries, MCC says it designs its programs to balance interventions in agriculture with substantial investments in infrastructure, financial sectors and small business development or land tenure reforms. The impacts of these programs on household income are measured taking into account the combined effects of these interventions.

### US Private Philanthropy

Philanthropy from the United States to developing countries—which includes contributions from foundations, corporations, PVOs, individual volunteers, religious organizations and colleges and universities—reached \$37.3 billion in 2008 up from \$36.9 billion in 2007 (Table 25).<sup>42, 43, 44</sup>

**Table 25. US Private Philanthropy to Developing Countries, 2008**

US Private Philanthropy for Developing Countries	Private Donations <i>bil \$</i>
Foundations	4.3
Corporations	7.7
Private & Voluntary Organizations	11.8
Volunteerism	3.6
Universities & Colleges	1.7
Religions Organizaitons	8.2
<b>Total Private</b>	<b>37.3</b>

*Source: Hudson Institute, Index of Global Philanthropy and Remittances, 2010*

<sup>42</sup> *Index of Global Philanthropy and Remittances*, 2010, Hudson Institute

<sup>43</sup> The Hudson Institute's Center for Global Prosperity has international partnerships with organizations across the developed world and uses those contacts to develop private giving estimates for 14 of the 22 DAC donor countries: Denmark, Finland, France, Italy, Luxembourg, Norway, the Netherlands, New Zealand, Portugal, Spain, Sweden, Switzerland, the United Kingdom, and the United States. The Institute notes that these countries reported total private giving of only \$19 billion to OECD in 2008, but the Institute's private research partners, however, found significant additional amounts of private giving from these countries. The Institute concludes that "This reflects the diverse, new world of international development where for-profits, nonprofits, religious organizations, universities, families and individuals can and are contributing to economic growth in the developing world." *Ibid.*

<sup>44</sup> *Index of Global Philanthropy and Remittances*, 2010, Hudson Institute



**A Broader View.** Using information from both public and private sources, it is possible to estimate the total private and public financial flows to developing countries in 2008, the latest data available (Table 26). These include private philanthropic efforts estimated to be about \$53 billion, remittances of \$181 billion, and private capital investment of \$121 billion. On the basis of this estimate, aid from all sources and donor countries was estimated to amount to \$355 billion, greater than the amount of Official Development Assistance alone which OECD says was about \$128 billion.

**Table 26. Global Engagement with Developing Countries, 2008**

Global Engagement with Developing Countries	Engagement Est, 2008 bil \$
Official Development Assistance 2/	128
Global Private Philanthropy	53
Remittances	181
Private Investment 1/	121
Total	483

1/ The Global Index of Philanthropy estimates that private investment in 2008 was down from about \$340 bil in 2007.

2/ OECD

Source: Hudson Institute, *Index of Global Philanthropy*

## Summary

Global concerns about poverty and hunger are real and have grown sharply as food prices have increased and become more volatile. This trend is important worldwide, but is especially worrisome for the poor who must spend as much as two-thirds of their income on food. Recently, it has prompted renewed attention to the need to raise and sustain global agricultural productivity, especially in developing countries. As USAID Administrator Dr. Rajiv Shah said at the September 2010 Clinton Global Initiative, "...we know that economic growth that comes from increasing agricultural productivity is nearly three times more effective in raising incomes of the poorest than increases in manufacturing or service productivity."

To stimulate the required acceleration in agricultural productivity, raise incomes and reduce hunger will require very large investments of capital, which can come from one or all of four different sources:

- domestic public spending by developing country governments;
- donations from developed countries and donor organizations;
- remittances from workers overseas; and
- private-sector investments.

The depth of the concern about lagging development has led to increased support from most of these sources. Many developing-country governments have pledged to increase to at least 10 percent the proportion of their national budgets that goes to support economic development and fight hunger. So far, however, few have actually met this commitment.

Developed-country governments and private donors both are helping, too, although the vast bulk of that support is for health, education and other economic and social priorities in addition to agriculture. In recognition of this, the l'Alquila G-20 summit in July 2009, pledged an additional \$20 billion for agricultural development over three years. In addition, important new private development efforts are being supported by several very large private foundations. But, here, too, it is still too early to judge whether these pledges will become reality and truly represent "new" investment or merely reprogrammed funding.

While commitments for assistance to developing countries have expanded, there is growing awareness that they are insufficient to create and sustain the essential accelerated agricultural productivity growth necessary to match needs. International agricultural development experts agree that the financial requirements in developing countries far, far exceed any amount realistically expected to come from either domestic budgets or international assistance *of all types*. This, of course, leads to questions regarding what

the capital investment needs are relative to the current flows and where the additional capital could come from.

The Global Harvest Initiative suggests additional perspective and clarity are needed to address these questions, especially since they are critical to developing and sustaining increases in agricultural productivity that will be necessary in the near future. This paper examined global productivity trends, investment flows and key development indicators. It reviewed the available literature in an effort to better define and assess the magnitude of investment needs and flows required to modernize agriculture and the food systems in developing countries.

The study also reviewed investment guidelines and performance estimates that suggest that developing countries need to spend at least 10 percent of their GDP on overall development efforts—some \$1,741 billion annually. Included in this need is a share for rural/agricultural development and that is a significant fraction in many countries, although electricity, water, health, education and many other “urban” needs have high development priorities and traditionally attract the bulk of the development spending.

Developing countries are estimated to have spent roughly 4 percent of their GDP from their own resources on development in 2008, about \$696 billion in the face of needs that are clearly closer to 2 ½ times that level. This comparison implies a huge overall annual development investment gap of many billions.

The main sources of investment flows and the proportion of this total that supports food productivity, include:

- The primary source, of course—the developing countries themselves;
- Aid from governments of OECD and other countries—Official Development Assistance (ODA)—along with private donations from foundations, corporations, private voluntary organizations, universities and colleges and religious organization are very important. Examples include:
  - Individual donor country programs such as USAID (Feed the Future Initiative) and Millennium Challenge Corporation development programs;
  - World Bank led global and food security programs, regional development bank programs, and dozens of other multilateral agency programs;
  - Hybrid public-private partnerships such as the Global Health Initiative that raise and disburse funds for particular purposes such as HIV-AIDS, Child health and many others;
  - Private foundation efforts, such as AGRA, the Clinton Global Initiative, and the William P. and Flora Hewlett Foundation, among many others.
- Remittances—investment from private individuals who are working overseas; and
- Investments by private, foreign firms in for-profit projects in developing countries.

These several distinct types of capital flows were identified, both for national development and for agriculture and anti-poverty efforts. The amounts are large, and those from public sources have been growing. Each was examined to address the question of whether they can reasonably be expected to increase agricultural productivity growth enough to meet anticipated mid-century needs.

The review found, for example, that Official Development Assistance from public donors and multilateral institutions reached \$128.6 billion in 2008 (most recent year for which comparable data are available), although the share of those funds that actually focused directly and indirectly on agriculture was modest—\$12.3 billion, about 10 percent.

Non-official donations were large, too—gifts from foundations, corporations, PVOs, individual volunteers, religious organizations and colleges and universities amounted to about \$53 billion globally in 2008 (with \$37.3 billion of that from US donors). These gifts also were targeted toward a broad range of purposes.

In addition, private remittances amounted to some \$181 billion in 2008 for a wide variety of uses and purposes. And, while there is little specific information about those purposes, they tend to be highly concentrated rather than distributed widely across the developing world.

Finally, direct investments by the private sector of \$121 billion were reported, with these flows spread across all economic sectors. These investments also tend to be highly concentrated in the BRIC countries—Brazil, Russia, India and China—and a few others rather than being distributed widely, especially in the poorer regions.

All together, capital flows from these public and private sources to developing countries totaled \$483 billion in 2008 (Table 27).

**Table 27. Developing Country Support for Overall Development and Agriculture, by Source, 2008**

Developing Country Assistance, 2008	Overall	Ag & Rural
		<i>bil \$</i>
Official Development Assistance 2/	128	12.8
Global Private Philanthropy 1/	53	5.3
Remittances 1/	181	18.1
Private Investment 1/	121	12.1
Total	483	48.3

1/ *The Global Index of Philanthropy, Hudson Institute*

2/ *OECD*

It is extremely difficult to track this capital to its destinations in developing country economies, but it is very clear that only a small portion actually focused on rural and agricultural development—in fact, it would appear generous to assume that the

proportion of all support funds available to agriculture is about the same as that officially estimated for ODA funds, or about 10 percent.

If that were indeed the case, then some \$48 billion would have been available in 2008. Although there is strong evidence from OECD and others that this estimate significantly overstates international investments in the development of productivity and agriculture, it is presented here to emphasize the point that the investment gap is very large, indeed!

If developing countries actually were able to spend as much as 4 percent of their GDP from their own resources on development in 2008, this amount plus the international development assistance of \$483 billion would still have left a huge investment gap of perhaps \$561 billion annually.

How much of that reflects critical needs for agriculture and rural development? It is not possible to say, with any precision. Not only is agriculture complex, but its economic setting in individual countries varies and is important in defining needs there. Clearly, agriculture is centrally important in these largely rural economies—for the 110 developing countries for which the World Bank has data for 2008, the agricultural share of GDP averaged 15.8 percent, but is clearly much, much higher for some (for 36 developing countries it ranges from 25 to 61 percent). Thus, it is reasonable to suggest that agricultural needs as a share of developing country investment requirements would average *no less than* the 15.8 percent agriculture already contributes to those economies.

That observation suggests the overall developing country spending gap includes agricultural development needs of at least \$88.7 billion—a very conservative estimate that nevertheless is almost twice the \$48 billion in agricultural support that was available from international sources in 2008. This estimate is conservative for an additional reason; it does not reflect the degree to which international assistance under-supports agriculture and rural infrastructure needs, perhaps in the amount of at least \$28 billion annually (Table 28).

**Table 28. Development Spending, Developing Countries & Overall and Agricultural Investment Needs**

<b>Development Gap, 2008</b>	<b>2008</b>
<b>Developing Countries</b>	<b>bil \$</b>
Development Spending Needs, 10 % GDP	1,740.8
Development Spending, Own Resources, 4%	696.3
International Assistance & Investment	483.0
<b>Development Spending GAP</b>	<b>561.5</b>
<b>Agricultural Needs, 15.8% Development GAP</b>	<b>88.7</b>

*Source: Based on World Bank Development Indicators, 2010*

*Note: The agricultural development GAP is an extremely conservative estimate that does not include the under-allocation of international assistance relative to agriculture's role in developing economies--in the amount of perhaps 5.8% of international assistance, or about \$28 billion.*

This Gap describes a critical, unmet investment need, and emphasizes the importance of finding effective ways to channel private capital into additional investments in developing country agricultural systems. GHI suggests that it is important for all stakeholders to recognize the critically large size of this Gap, and the important role that the private sector must play if the world is to better assure and sustain global food security.

While part of the additional investment amounts needed can be met by more robust public and private donor programs, the only feasible source for much of the rest is private investors, both from within developing countries and from outside firms .

This then raises the obvious question of how private support for agricultural productivity growth can be expanded and mobilized—what limits its growth today and how can these constraints be removed? Since some private companies already have significant operations in developing countries, the attraction of those markets is clear. The fact that incentive-driven investment is occurring in some developing countries already means that successful efforts to close the investment gap must include much stronger efforts to improve both the investment climate and the potential for economic returns in target development areas.

While development experts frequently agree about the importance of improving the investment climate in developing countries, many then conclude that the task is daunting and difficult with the programs at hand. At the same time, it would seem clear that making this objective a more important priority among donor countries would sharply increase the likelihood of its success.

A key beginning could be with the Obama Administration's global food security initiative *Feed the Future*, and it applauds the administration for providing strong leadership in this area. However, while that initiative gives a rhetorical nod to the importance of private-sector involvement, a higher priority and clearer focus will be required to achieve its ambitious goals.

For example, a more structured mechanism would better facilitate exchanges of ideas and views between the government and private companies on an ongoing basis—a process that could help harness private-sector capital (as we are suggesting above). Establishing an effective government/industry partnership could buttress efforts to achieve sustained agricultural development with the potential to lift millions out of poverty and significantly reduce the number of malnourished—now approaching 1 billion worldwide.

Moreover, it is important to recognize how central good governance is to efforts to marshal increased private support for the development of agricultural systems in Africa, Central America, Asia and elsewhere. The fact is that private investment—the only approach that can sustainably increase agricultural productivity to necessary levels—cannot be expected to put scarce capital at risk where the government is untrustworthy or corruption rampant, or where essential infrastructure is missing. GHI urges the administration to make such concerns much more prominent and integral parts of the

*Feed the Future* initiative and in *all other areas of engagement with developing countries*. And, it urges the administration to use its development assistance programs as leverage to provide incentives for developing country governments to create a more favorable business climate, for both indigenous private sectors and for foreign capital.

The suggested increase in the priority given to improved business climates reflects the importance these investors attach to balanced investment and development. This is not to ignore the need for direct investment in agriculture, but rather to recognize the crucial importance of access to markets, support facilities and services which are expensive to build and maintain, but essential for competitive growth.

Increasing the priority of improved business climates also recognizes the importance of rural infrastructure to fully functioning markets and to broadly effective rural development. For example, investment in good roads is important because their lack or inadequate maintenance often means producer and community isolation, high costs and low returns. And, roads are but one of the many components essential for sustained development and growing future productivity.

This review observes the Millennium Challenge Corporation development logic model and the extent to which it focuses on the role of infrastructure in development. This model recognizes that balanced development that includes infrastructure is crucially important to agricultural modernization and productivity development—key goals of these efforts.

To address these complex investment challenges, GHI suggests that a much more robust Millennium Challenge Corporation with its broad view of the essential links between agricultural/rural infrastructure and institutions is essential to enable and stimulate the private sector to expand its business activity in developing countries. It also suggests that rather than create more new programs and more bureaucracy, the government make better use of a program that already exists—by doubling MCC funding for FY2011 and beyond. MCC funding in FY2010 was \$1.1 billion; doubling this amount could quickly make MCC a far more prominent and effective part of the Feed the Future Initiative.

Investment in developing countries clearly entails higher risks than in developed countries, and it is true that capital tends to flow to business environments with clearly defined and uniformly administered rules and regulations. At the same time, businesses tend to minimize their exposure to environments characterized by official favoritism and uneven application of taxes, regulations, ownership limits, discretionary tariffs, and customs practices. Such conditions effectively stymie the flow of investment as firms seek more favorable alternatives. In short, GHI suggests that improvement of the business climate in developing countries be a threshold requirement for global food security initiatives offered any nation.

Finally, GHI suggests that a new, fresh look be given to efforts to stimulate additional private sector involvement, and that there are effective tools that can induce more rapid investment in developing countries. These include tax incentives and other non-

traditional approaches that could be thoroughly explored. An example would involve using the concepts underlying the Orphan Drug Act to develop a Neglected Crop Act to induce additional investment in food crop genetics, possibly using patent extensions and tax incentives to encourage companies to develop more productive crops where commercial market potential is otherwise limited. This could be extended to processing, irrigation and harvesting technologies specific to a particular part of the world. GHI strongly suggests exploration of new approaches such as this one through legislation that could make this a reality.

Clearly, there is much work to be done to ensure that the enormous gap between developing country investment needs and availability be closed, a critical objective in efforts to provide the food, feed, fiber, energy and other needs of a rapidly growing world.

The role of private capital in addressing these challenges is paramount. And, while private investors clearly are prepared to engage and invest in developing countries, additional means of making this possible are needed. By properly structuring and adequately funding initiatives like Feed the Future and the Millennium Challenge Corporation, and by facilitating opportunities for government and industry collaboration, the investment gap can be significantly reduced or closed, making it possible to better meet the food needs of an ever-growing global population.

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## Appendix A: Infrastructure Defined

The concept, in its broadest sense, includes physical facilities, institutions and organizational structures—the social and economic foundations—for the operation of a society.<sup>45</sup> Economic Infrastructure includes the group of systems that underpin the functioning of other economic activities, including electricity, gas, telecommunications, water and sewage, airports, roads, railways and seaports (the last four collectively referred to as transport infrastructure).<sup>46, 47</sup> Infrastructure activities are often regarded by many investors and operators as high-risk undertakings, especially in developing or transition economies.<sup>48</sup>

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<sup>45</sup> Generally, social infrastructure with its emphasis on health and education is distinguished from economic infrastructure, which directly supports production and distribution activities of enterprises across their value chains, and which are directly relevant to the competitiveness of firms and to economic development.

<sup>46</sup> This definition is fluid, especially concerning advanced information and communication technologies (ICT) that have affected the nature of telecommunications facilities and services. Source, *WIR, UNCTAD, 2008*.

<sup>47</sup> It is common to distinguish between the infrastructure industries per se and broader, related activities, which include services directly relying on the provision of infrastructure. For example, airports and seaports – and the services they provide to vehicle and aircraft operators – are included as infrastructure, but not the actual air transport or shipping activities that utilize these infrastructure facilities and services. It also is common to make a distinction between those firms whose primary operations are in an infrastructure industry (firms “rooted” in infrastructure) and those, such as manufacturing or financial firms, that have ancillary operations in infrastructure. *Ibid.*

<sup>48</sup> Key Characteristics of Infrastructure Industries:

**Electricity.** There are three segments to this industry, generation, transmission and distribution. Together, they form an essential part of the backbone of a modern economy, necessary for production efficiency, economic growth and industrial development—as well as improved quality of life. The industry is technology- and innovation-intensive, and also sensitive to social considerations, such as concerns over climate change and environmental conservation.

**Telecommunications.** Within this segment, fixed-line telephony, mobile telephony, and transmission of digital data are the most important segments. They differ from each other in terms of their technology, how services are delivered, and in some of the specific services they offer to consumers. Investment in telecommunications infrastructure networks help firms in other industries improve and expand their production capacities.

**Transport** comprises a heterogeneous group of industries, including roads, railways, airports and seaports. An integrated transport infrastructure is essential to link underdeveloped parts of a country and regions into the global economy. For manufacturing and trading activities, the quality and coverage of transport networks significantly influences the costs of production and distribution. In this context, the role played by seaports is critical, because around 80% of global trade is estimated to be carried by sea. Thus efficient seaports can directly and indirectly contribute to the development of an economy by facilitating trade and providing a hub for industry clusters, which may also provide backward linkages in skills, technology and investment.

**Water.** All activities along the water industry supply chain – extraction, transmission, distribution and supply – involve economies of scale. For this reason, the provision of water services typically involves high sunk and fixed costs incurred by large-scale centralized projects, and requires significant energy inputs. At the same time, the expansion of services, the replacement or maintenance of existing facilities, and their adaptation to security and environmental norms require large capital investments and considerable planning. Water supply has failed to keep pace with rising world population, leading to chronic shortages in several regions of the world. This is however due mostly to problems with water management and investment problem, and less to the lack of available sources of water. The gravity of the situation is reflected in the MDG declarations that recognize water availability and access as a priority goal. Even in developed countries, affordability of safe water among the poorer segment of society has become a critical

## Appendix B

### *The 24 Development Assistance Committee Members and Date of Membership:*

**Australia**, Member since 1966.  
**Austria**, Member since 1965.  
**Belgium**, Member since 1961.  
**Canada**, Member since 1961.  
**Denmark**, Member since 1963.  
**Finland**, Member since 1975.  
**France**, Member since 1961.  
**Germany**, Member since 1961.  
**Greece**, Member since 1999.  
**Ireland**, Member since 1985.  
**Italy**, Member since 1961.  
**Japan**, Member since 1961.  
**Korea**, Member as of 1 January 2010.  
**Luxembourg**, Member since 1992.  
**Netherlands**, Member since 1961.  
**New Zealand**, Member since 1973.  
**Norway**, Member since 1962.  
**Portugal**, Joined the DAC in 1961, withdrew in 1974 and re-joined in 1991.  
**Spain**, Member since 1991.  
**Sweden**, Member since 1965.  
**Switzerland**, Member since 1968.  
**United Kingdom**, Member since 1961.  
**United States**, Member since 1961.  
**Commission of the European Communities**, Member since 1961.

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issue. Moreover, it must be borne in mind that water is used not only for direct human consumption, but also for economic purposes in agriculture and manufacturing. In 2000, only 10% of world water withdrawal took place for households. Industry accounted for 20% and agriculture for 70%. In developing and transition economies, these shares were 9% (households), 12% (industry) and 79% (agriculture). *Ibid.*

## Appendix C.

**Table 29. US Foreign Assistance Budget, Actual and Requested**  
*mil \$*

Strategic Goals	FY2009	FY2010(e)	FY2011®
<b>1. Achieving Peace and Security</b>	<b>9584.6</b>	<b>9047.3</b>	<b>10843.6</b>
Counter-terrorism			537.9
Combating Weapons of Mass Destruction			346.8
Stabilization Operations and Security Sector Reform			7893.2
Counter-Narcotics			1139.1
Transnational Crime			102.5
Conflict Mitigation and Reconciliation			824.0
<b>2 Governing Justly and Democratically</b>	<b>2702</b>	<b>2663.1</b>	<b>3333.0</b>
Rule of Law and Human Rights			897.2
Good Governance			1614.0
Political Competition and Consensus-Building			271.3
Civil Society			550.5
<b>3. Investing in People</b>	<b>10286.1</b>	<b>10520.3</b>	<b>10972.3</b>
Health			9386.6
Education			1098.9
Social and Economic Services and Protections for Vulnerable Populations			486.8
<b>4. Promoting Economic Growth and Prosperity</b>	<b>3988.8</b>	<b>4292.3</b>	<b>5526.9</b>
Macroeconomic Foundation for Growth			236.5
Trade and Investment			322.6
Financial Sector			141.4
Infrastructure			1317.1
Agriculture			1766.1
Private Sector Competitiveness			649.2
Economic Opportunity			278.8
Environment			815.3
<b>5. Providing Humanitarian Assistance</b>	<b>4883.9</b>	<b>4030.2</b>	<b>4005.8</b>
Protection, Assistance and Solutions			3860.9
Disaster Readiness			105.3
Migration Management			39.6
6. Promoting International Understanding	n/a	n/a	n/a
<b>7. Strengthening Consular and Management Capabilities</b>	<b>1265.9</b>	<b>1735.9</b>	<b>1707</b>
<b>Total Foreign Assistance</b>	<b>32,711.3</b>	<b>32,289.1</b>	<b>36,388.6</b>

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On irrigation infrastructure, Foster said there are 17 million acres of new irrigation potential. Rural Information and Communication Technologies (ICT) infrastructure, most of it financed from the outside, reaches only 7 percent of Africa's rural population. Electrification reaches only 5 percent of the rural population in most countries and has a growth rate of a mere 0.5 percent annually. The overall cost of reaching infrastructure targets on universal ICT coverage, irrigation, and electricity for 2.5 million users is estimated at \$25 billion over a decade.

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