ISSUE 2

LEVEL, TREND AND SOURCES OF FINANCING FOR INVESTMENT IN AGRICULTURE
A REVIEW AND ANALYSIS OF AVAILABLE SOURCES OF DATA

STUDY ON APPROPRIATE POLICY MEASURES TO INCREASE INVESTMENTS IN AGRICULTURE AND TO STIMULATE FOOD PRODUCTION
GCP/GLO/267/JPN

Level, trend and sources of financing for investment in agriculture

A review and analysis of available sources of data

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[1] **Financial resource flows to agriculture:** A review of data on government spending, official development assistance and foreign direct investment, Sarah K. Lowder and Brian Carisma, ESA Working Paper No. 11–19, December 2011, Agricultural Development Economics Division.

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Abbreviations and Acronyms

ACS	Agricultural Capital Stock
ASTI	Agricultural Science and Technology Indicators
CGIAR	Consultative Group on International Agricultural Research
COFOG	Classification of the Functions of Government
CSO	civil society organization
CSR	Creditor Reporting System
DAC	Development Assistance Committee
DFID	Department for International Development
EAA	External Assistance to Agriculture
ECA	Europea and Central Asia
EUROSTAT	European Statistics
FAO	Food and Agriculture Organization of the United Nations
FAOSTAT	FAO Statistical Databases
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GFCF	Gross Fixed Capital Formation
GFS	Government Finance Statistics
HDI	Human Development Index
ICOR	Incremental Capital/Output Ratio
IFAD	International Fund for Agricultural Development
IFPRI	International Food Policy Research Institute
IMF	International Monetary Fund
ISIC	International Standard Industrial Classification
ITC	International Trade Centre
MDG	Millennium Development Goal
NGO	non-governmental organization
ODA	Official Development Assistance
OECD	Organisation of Economic Co-operation and Development
PER	Public Expenditure Review
PIM	Perpetual Inventory Method
R&D	Research and Development
SNA	System of National Accounts
SPEED	Statistics of Public Expenditure for Economic Development
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nation Development Programme
UNSTAT	United Nation Statistics
WDI	World Development Indicators

1. INTRODUCTION

There is global concern about the challenge of financing agricultural development across the developing world at a time of increasing food prices and worsening food insecurity for many. Accelerated agricultural growth is not only needed to meet growing global demand for food and energy, but is also seen as the main pathway out of poverty for many poor people and countries.

Agricultural investment is one of the most effective ways to promote economic growth and development and to reduce poverty and hunger for urban and rural people alike. Investment is also necessary – although not sufficient – to ensure the sustainability of agricultural ecosystems, ending hunger and malnutrition and for putting global agriculture on a more sustainable basis. This has promoted governments in both developing and developed countries to prioritize investment in agriculture. Both G-8 and G-20 have committed themselves to increasing investments in agriculture in order to stimulate food production.

It needs to be recognized that there are different types of investors operating in agriculture and the agrofood value chain, including small and family owned farms, large commercial farmers, domestic corporate sector players, transnational corporations, sovereign wealth funds, the public sector (international, regional, national and local governments) and donors, and they all have different objectives and roles. There is also a variety of sources of financing for investment, including savings/retained profits, credit (from formal/informal sources), equity financing, donations/grants, Foreign Direct Investment (FDI) and government revenues, and these sources are not equally accessible to all investors.

As regards investment capital, it comes in many forms: financial capital, productive capital, fixed capital, working capital, as well as human capital, social capital and natural capital. Different forms of capital cannot simply be added together to determine the total amount of capital available or needed. They overlap and complement each other, and some forms of capital cannot be substituted for others. Moreover, different types of investors exercise varying degrees of control and ownership over these different types of capital, and at different stages along value chains.

Therefore, for an effective programme to increase investment in agriculture it is essential to understand what has been the past and current level and trend of investment, who were the investors and what were the sources of investment in agriculture.

This report aims at summarizing available data on investment, critically review the sources of data and their definitions and then provide (i) an analysis of the level, trend and composition of investment in agriculture; and (ii) the sources of investment capital. The report is organized as follows: Section 2 provides a scanty overview of the way the term “investment” is used in the literature and then describes the available data sources on investment. Section 3 provides an analysis of the level, trend and composition of investment, based on the available data. Section 4 elaborates on the sources of investment capital in agriculture and analyses the relative contribution of the different sources. Section 5 provides an analysis of the trend, composition and sources of agriculture investment for different countries in different regions. The summary and conclusions are presented in section 6.

2. Available Data and Sources of Financing for Investment in Agriculture

Although the term "investment" is used in a variety of different ways, for quantifiable measurement of investment it has been defined as follows:

a) **Change in capital stock**: Under the normal economic definition, as used in national income accounting, investment is "the change in fixed inputs used in a production process" (Zepeda, 2001). This can also be defined as change from one year to the next in the value of Agricultural Capital Stock (ACS), which is typically used for one year or longer. Capital stock as a measurement of investment in agriculture includes estimates of (i) Gross Fixed Capital Formation (GFCF), based on national accounts; and (ii) on-farm capital stock, based on inventories of agricultural assets.

b) **Change in comprehensive capital stock**: This definition extends the concept of "change in capital stock" commonly used in national income accounting in that it takes into account changes in other forms of capital, including environmental (biodiversity, genetic resources, soil quality), human, and social capital, and the stock of available knowledge and technologies.

c) **Changes in output-enhancing inputs**: According to FAO "agricultural investment refers to changes in the level of all inputs that augment agricultural production capacity" (FAO, 1999). This definition has been mainly used by FAO to estimate future investment requirement, based on Incremental Capital/Output Ratio (ICOR) and a fixed input-output relationship.

In spite of the above quantifiable definitions, comprehensive data on investment in agriculture at global level are fragmented and incomplete both in terms of country and temporal coverage.

As regards sources of investment, finance in agriculture data are available only for the following:

- Public expenditure in agriculture;
- Official Development Assistance (ODA);
- Foreign Direct Investment (FDI);
- Agriculture Research and Development (R&D) expenditure.

Table 1 summarizes the main sources of internationally comparable data for agricultural investment, as well as sources for financing investment.

Table 1: Sources of international data on agricultural investment

Elements of investment	Data sources	Comments
Agricultural Capital Stocks (ACS), based on UN System of National Accounts (SNA).	(I) World Bank/FAO; UNSTAT	The indicator was first developed by Crego *et al*. (1998), Larson *et al*. (2000) and later expanded in country and temporal coverage by FAO (2011a). Currently the estimates cover only 82 countries.
Fixed capital in agriculture	(ii) Farm Foundation	Using a modified methodology to the one developed by Crego *et al*. (1998), referred above, Butzer *et al*. (2010) has computed fixed capital in agriculture for 30 developed and developing countries. www.farmfoundation.org
Farm level capital stock, based on inventories of agricultural assets	FAOSTAT database	Covers 206 countries from 1975 to 2005, based on inventories of agricultural assets.
Public expenditure in agriculture	IMF Government Finance Statistics (GFS); FAO dataset and SPEED database of IFPRI	No distinction between current expenditure and investments in agriculture.
Official Development Assistance (ODA)	OECD CRS and FAO EAA dataset	
Foreign Direct Investment (FDI)	UNCTAD; and ITC Investment Map	
Expenditures on agricultural Research and Development (R&D)	OECD, EUROSTAT, ASTI-IFPRI	ASTI report data for low-income countries. http://www.asti.cgiar.org/home).

2.1. Agricultural Capital Stocks (ACS) based on UN System of National Accounts (SNA)

A dataset measuring ACS, derived largely from the United Nations System of National Accounts data (SNA),[2]referred to as "national accounts-based agricultural capital stock estimate", was first developed by Crego *et al*. (1998) for 57 countries. Larson *et al*.

(2000) extended the country coverage to 60. Butzer *et al.* (2010) modified the methodology used by Crego *et al.* (1998) and Larson *et al*. (2000) and built an updated dataset for 30 countries. Recently FAO (2011a) expanded the dataset of Crego and Larson, both in terms of country and temporal coverage. Currently the estimates cover 82 countries, which include 40 middle-income countries and 4 low-income countries.

FAO (2011a) estimate the value of physical capital, tree stocks and livestock. The value of physical capital is computed by using national estimates of gross investment in agriculture and a variation of the Perpetual Inventory Method (PIM), whereby fixed capital stock is measured using the stream of additions provided by investment and reductions caused by depreciation of stocks. Physical capital stocks are estimated for each country in constant

[2] The concept of "Gross Fixed Capital Formation (GFCF)" is what is measured in the UN System of National Accounts (SNA). GFCF is classified in the SNA according to type of investment (land improvement, machinery, etc), and whether it is in the public or private sector. It may also be classified by the "kind of activity of owner", that is the industry according to the International Standard Industrial Classification (ISIC). This can in principle be used to identify investment directly in agriculture, and also (if data is available at a much disaggregated level) in a variety of agriculture-related activities (such as input supply, processing, marketing). However, agriculture-related activities are spread across a wide range of different ISIC codes, and data is generally presented in an aggregated form that allows identification of all investment in agriculture-related industries.

local currency units and converted to constant dollars, using *inter alia* the United States agricultural value-added deflator. The value of livestock holdings is estimated using livestock numbers from FAOSTAT, which are valued in current dollars using regional 5-year moving averages (weighted by quantity) of implicit unit import/export prices, also obtained from FAOSTAT. The value of tree stocks and permanent crops represents the present value of the future stream of profits they generate. Profits are assumed to be 5 percent of the value of output, which is calculated using average national yields and 5-year moving averages for the prices. The stream of these profits is calculated assuming that permanent crop fields are at their half-life, which is crop specific and is discounted using a "real" rate of return, the difference between a 10-year US bond and the inflation rate measured by the US GDP deflator.

Strength and weaknesses of the national accounts-based estimates of ACS
The major strength of the national accounts-based approach is its use of national-level estimates of agricultural investment, which means that a broader set of assets is being accounted for. Furthermore, the use of a variation of the PIM method allows a more methodologically sound estimate of the ACS. A major weakness of this approach is that it can only produce estimates of ACS for countries with well-established national accounting.

2.2. Inventories-based estimate of ACS- on-farm capital stock

The most comprehensive and readily available data for empirical measurement of investment in agriculture is the FAO estimate of on-farm capital stock. FAO has prepared estimates of on-farm capital stock for 206 countries from 1975 to 2005 based on *inventories of agricultural assets* contained in the FAOSTAT database. There is no other database that comes close to it in terms of country and temporal coverage. The inventories-based estimates of agricultural capital stock were first developed as an indicator for the World Agriculture: Towards 2010 report (Alexandratos and FAO, 1995), subsequently recalculated and improved in FAO (1999), FAO (2002), Barre (2006), and recently by FAO (2011c). The estimates are based on data on quantities of agricultural assets, valued and aggregated based on fixed US dollar prices of 2005. The estimates thus represent an index of quantities of capital stock and are referred to as the inventories-based estimate of ACS. The indicator is composed of the following four main components: land improvements, livestock, and machinery and farm structures. Land is valued only as improvements in changing land use from grasslands to arable land, or to irrigated lands. Machinery and livestock are obtained from FAOSTAT. In the absence of information on physical stocks, the value of hand tools is imputed with a fixed value per agricultural worker. Also, to include farm structures, it is assumed that a fixed proportion of livestock (animal specific) is associated with a number and value of infrastructure. Depreciation (for land improvements, machinery and structure), which varies by component, is accounted for in the estimates of net ACS.

Strength and weaknesses of the inventories-based estimates of ACS
The major strength of the inventories-based estimates of ACS is its global coverage. A major weakness is that it captures a restricted set of the total physical capital stock. Furthermore, it cannot capture technical change. This has two ramifications, both across countries and across time. First, it cannot account properly for technological differences across countries. For example, in the case of tools it cannot account for the fact that an average farmer in a high-income country is likely to have much more tools and equipment than a farmer in a low-income country, both in terms of quantity and value. Second, technological change over time is ignored. For example, the expansion of intensive practices in livestock will lead to growing underestimations of farm structures with the use of fixed ratios of farm structures to livestock heads. There also appears to be problems with some of the data on physical assets, including poor reporting and/or lack of data. This is especially the case for high-income countries; for instance some high-income countries have discontinued data collection on tractors. Another limitation is the use of fixed prices, which do not consider changes in the

valuation of assets. On the whole, for these reasons, the inventories-based capital-stock estimates are likely to underestimate the true level of on-farm capital, especially in the case of high-income countries.

2.3. Public Expenditure in Agriculture

Internationally comparable data on public expenditure in agriculture is reported by many countries, but without a distinction between current expenditure and investments and information on public capital stock and investment flows. Hence, systematic information on government expenditure does exist, but it is generally not possible to ascertain to what extent the reported expenditure can be considered investment and contribute to the formation of capital.

The most comprehensive databases allowing to assess government expenditures in agriculture and other sectors are (i) the Statistics of Public Expenditure for Economic Development (SPEED) database compiled by the International Food Policy Research Institute (IFPRI); and (ii) the FAOSTAT database on Government Expenditure in Agriculture.[3]

The SPEED database provides information on government expenditures for seven sectors from 1980 to 2007 for 54 low- and middle-income countries and 13 high-income countries. African countries and countries in Oceania are under-represented in this database. The SPEED was compiled primarily using the International Monetary Fund (IMF) Government Finance Statistics Yearbook, supplemented with information from country publications from the IMF, Public Expenditure Reviews by the World Bank and country publications from various government agencies. It also provides information not only in national currency but also in comparable monetary units so that regional averages may be reported (FAO, 2011b).

The FAOSTAT database on Government Expenditure in Agriculture refers to all non-repayable payments, whether capital or current, required or not by government. Expenditures are shown by function or purpose at different levels of government administration: Central Government; State, Region or Province; and Local Governments. The data given refer to the share of expenditure on agriculture, forestry, fishery and hunting (function) in the total government expenditure.

The database covers the period from 2000 to 2010 or up to the most recent year available. The database has been compiled for approximately 122 countries based on the standard Classification of the Functions of Government (COFOG). However, the number of countries that provide data varies from year to year. COFOG is a system used to identify the socio-economic objectives of current transactions, capital outlays and acquisition of financial assets by general government and its subsectors, and therefore it is expected to facilitate the monitoring of government expenditures on agriculture and rural development.

The FAO and IMF joint questionnaire is the primary source of data for tracking the allocation of government expenditures on agriculture and rural development. The questionnaire is based on COFOG that was developed through various contributions received from the UN, OECD and IMF and from other international organizations.

2.4 Official Development Assistance (ODA) to agriculture

OECD Creditor Reporting System (CRS) database

The Organisation for Economic Co-operation and Development (OECD) provides a database on ODA that is called the OECD Creditor Reporting System (CRS). This database affords us the opportunity to consider allocation of assistance to agriculture as well as other sectors by recipient country and region. CRS records official development assistance at the project level and spans the years 1973 to 2010 (FAO, 2011b).

[3] This database is not publicly available.

The CRS does not include data from all donors, but it includes data from all of the Member States of the OECD's Development Assistance Committee (DAC) as well as some 14 multilateral organizations. The number of multilaterals included has increased in recent years. The number of recipient countries for which commitments are recorded has also increased in recent years; in 2009 there were about 154 countries and 17 country groups to which commitments had been made. Data of CRS are collected through a standardized methodology/questionnaire; therefore, comparative analysis is allowed between data of different donors.

CRS includes several sectors, such as social infrastructure and services, economic infrastructure and services production sectors (including agriculture, forestry and fishing), multisector, general programme assistance and humanitarian aid. The category of agriculture includes subcategories, such as agricultural policy, agricultural development, crop production, agricultural inputs, agriculture education, research and services, and agricultural land and water resources. However, it excludes rural development (classified as multisector), agro-industries (industries under production sectors), developmental food aid (general programme assistance) and emergency food aid (humanitarian aid).

FAO dataset on ODA to agriculture – External Assistance to Agriculture (EAA)

The FAO dataset related to ODA is called External Assistance to Agriculture (EAA).[4] The EAA dataset contains concessional (ODA) and non-concessional (if the commitment has a grant element lower than 25 percent) commitments made by bilateral and multilateral donors to developing countries.

The main purposes of commitments for EAA can be broken down into narrow and broad definition of agriculture. The narrow definition of agriculture includes the following purposes: agricultural services, crop production, fisheries, forestry, inputs, land and water, livestock, research, training and extension. In addition to the purposes listed in the narrow definition, the broad definition of agriculture includes the following purposes: agro-industries, environment protection, manufacturing of inputs, regional and river development, rural development/infrastructure.

The EAA dataset covers the period from 1974 to 2009 for which data are available for nearly 24 bilateral and a maximum of 34 multilateral donors respectively. Recipients are approximately 170 developing countries. The EAA dataset covers bilateral donors such as the members of DAC formed by OECD, Bilateral Arab Banks and funds such as Kuwait Fund, and multilateral donors such as the World Bank, Regional Development Banks (Asian Development Bank, African Development Bank/Fund, Inter-American Development Bank, Caribbean Development Bank, Arab Development Funds) and international organizations such as FAO, United Nations Development Programme (UNDP), Consultative Group on International Agricultural Research (CGIAR) and International Fund for Agricultural Development (IFAD). The EAA dataset covers several additional multilateral donors in addition to those covered by OECD/CRS.

2.5. Foreign Direct Investment (FDI) in agriculture

The two main sources of data on FDI in agriculture are (a) the United Nations Conference on Trade and Development (UNCTAD) and (b) the Investment Map compiled by the International Trade Centre (ITC).[5]

The United Nations Conference on Trade and Development (UNCTAD)

[4] This dataset is not publicly available.
[5] There are other sources of data on FDI such as World Bank and OECD. However, they do not provide data on FDI related to agriculture or data at a global level.

UNCTAD provides the most comprehensive data on FDI to all sectors. It is available through the online platform, UNCTADstat. Although this data on FDI to all sectors is available to the public on the UNCTAD website, it does not provide a sectoral breakdown of FDI.

FDI by sector is provided through another UNCTAD dataset (FAO, 2012c). The sectoral FDI dataset classifies FDI as either investment in primary, secondary or tertiary sectors as well as designating it by subsector (agriculture, hunting, fishery and forestry; and food, beverage and tobacco). The dataset runs through 2010.

FDI includes the three following components:

- equity capital;
- reinvested earnings;
- intracompany loans.

Equity capital is the foreign direct investor's purchase of shares of an enterprise in a country other than that of its residence. Reinvested earnings comprise the direct investor's share (in proportion to direct equity participation) of earnings not distributed as dividends by affiliates or earnings not remitted to the direct investor. Such retained profits by affiliates are reinvested. Intracompany loans or intracompany debt transactions refer to short- or long-term borrowing and lending of funds between direct investors (parent enterprises) and affiliate enterprises.

Data on FDI flows are presented on net basis (capital transactions' credits, less debits between direct investors and their foreign affiliates). Net decreases in assets or net increases in liabilities are recorded as credits (with a positive sign), while net increases in assets or net decreases in liabilities are recorded as debits (with a negative sign). FDI stock is the value of the share of their capital and reserves (including retained profits) attributable to the parent enterprise, plus the net indebtedness of affiliates to the parent enterprises.

The dataset compiled by UNCTAD is the only available dataset comprising subsectoral data related to agriculture and agro-industry with a global coverage and long-time series. However, this dataset has several limitations. It includes data of a limited number of countries and data of different countries in any given year, and covers only data of transnational corporations that do not cover other types of investments such as mutual funds, banks, pension funds, hedge funds and private equity funds, as well as state-owned funds. In addition, because the data are reported in current US dollar values (without considering inflation) increase in the dataset is exaggerated.

Investment Map database

Investment Map compiled by ITC is another dataset that provides global FDI data. This database is available on the ITC website. The Investment Map provides data on FDI as well as foreign affiliates, international trade and market access. It includes data of FDI flows and stocks that are broken down by industry, based on the International Standard Industrial Classification Revision 3.0, being disaggregated at subcategory level, such as growing crops, market gardening and horticulture under agriculture and hunting. The Investment Map covers recent four years between 2007 and 2010. In addition, because the main data source is the UNCTAD dataset it has the same limitations that the UNCTAD dataset has.

2.6. Agricultural Research and Development (R&D) expenditures

Investment in agricultural R&D is another crucial contributor to agricultural productivity. Science and technology indicators disseminated by the OECD as well as by EUROSTAT provide information on spending on agricultural R&D in high-income countries. For low- and middle-income countries, the most comprehensive dataset on investment in agricultural R&D is available through the Agricultural Science and Technology Indicators (ASTI), facilitated by the International Food Policy Research Institute (http://www.asti.cgiar.org/home).

Because of the difficulty in data collection, the most recent year for which ASTI has complete information on both public and private agricultural R&D investments for all regions of the world is 2000.

3. Sources of Finance and Investment in Agriculture Analysis of Available Data

3.1 Level, trend, composition and sources of investment in agriculture at farm level

FAO estimates of on-farm capital stock for 206 countries from 1975 to 2007, based on inventories of agricultural assets, are available in the FAOSTAT database. According to this dataset, globally the volume of on-farm ACS has shown a very modest annual growth rate of 0.58 percent since 1980. It grew by 1 percent annually during the 1980s, followed by significantly lower growth rate of 0.18 percent during the 1990s and then recovering to 0.56 percent for period 2000/07 (Table 2).

However, the rate of growth has been uneven across regions and countries. Breakdown of the data between low- and middle-income countries and the high-income countries (Table 2) shows that, in the low- and middle-income countries the average annual growth rate of ACS was 1.3 percent in the 1980s and declined to 0.40 percent in the 1990s, and increased subsequently to 0.9 percent during the period 2000/07. In the high-income countries it grew at a lower rate, 0.5 percent in the 1980s, and declined in the 1990s and also during the period 2000–2007.

Table 2: Average Annual Growth in ACS, 1980-2007 (%)

Average Annual Rate of Growth %				
	1980/89	1990/99	2000/07	1980/07
WORLD	0.98	0.18	0.56	0.58
HIGH-INCOME COUNTRIES	0.5	-0.16	-0.09	0.1
LOW & MIDDLE-INCOME COUNTRIES	1.29	0.39	0.92	0.86
Region				
EAST ASIA & PACIFIC INCL. CHINA	1.57	1.59	1.35	1.52
OF WHICH: CHINA	**1.96**	**1.72**	**0.64**	**1.53**

Source: FAO ACS data
Note: *Data for countries in the ECA region is for the period 1992 to 2007.

At regional level, the rates of ACS growth have been consistently positive across regions with the exception of Europe and Central Asia. Sub-Saharan African countries had increasing average annual growth. South Asia, including India, had positive growth but at declining rate since early 1990s. Excluding China, the East Asia and Pacific region had an increasing growth rate with an annual average of 1 percent for the period 1980/89 and the growth rate more than doubled in the subperiod 2000/07.

Level and trend of ACS according to data based on the UN System of National Accounts (SNA)

The level and trend of ACS, when measured using the data based on the United Nations SNA, referred to as "national accounts-based agricultural capital stock estimate", is given in Table 3 for the purpose of comparison with the FAO estimates based on inventories of agricultural assets. The result shows, while the level of ACS estimated by the two different methods differ enormously, the trend and rate of growth are very similar.

Table 3: Average annual growth in ACS, 1980–2005 (national accounts-based estimates in local currency units of 1990)

Region	Average annual rates of growth %			
	1980/89	1990/99	2000–2005	**1980–2005**
World (70)	2.16	0.67	2.38	**1.33**
High-income countries (32)	2.73	0.67	0.64	**1.55**
Low- & middle-income countries (38)	**1.70**	**0.67**	**3.84**	**1.19**

Source: FAO

Note: In parentheses are the number of countries. The growth rates for the world and the regional groupings are simple mean of the average annual growth in agricultural capital stock valued in local currency for 70 countries.

3.2. Agricultural capital stock (ACS) per agricultural worker

ACS per agricultural worker is an important indicator because the amount of capital a farmer or agricultural worker uses (the capital-labour ratio) are significant determinants of his/her labour and land productivity.

According to the FAO data, over the period 1980–2007 capital stocks per worker at global level decreased at an average annual rate of 0.51 percent as a result of the agricultural labour force expanding more rapidly than agricultural capital stock. In the low- and middle-income countries as a whole the capital-labour ratio had a negative growth rate of -0.3 percent. In the high-income countries, the ratio of capital to labour increased significantly, not as a result of a rapid increase in capital, but because of a rapid decline in the agricultural labour force (Table 4).

In terms of variation across geographical regions, per capita levels were lowest and declining in East Asia and the Pacific, South Asia and sub-Saharan Africa, while the per capita levels were highest and increasing in Latin America & Caribbean and Middle East and North Africa.

The recorded decline in ACS per worker in the low- and middle-income country group may be because of the declining levels in sub-Saharan Africa and in India. Sub-Saharan Africa and India, both saw an increase in total ACS over time but not at a rate sufficient to keep pace with growth in the agricultural labour force. While capital-labour ratios increased in the remaining low- and middle-income regions, the highest average rates of growth occurred in the Middle East, North Africa, and Latin America and the Caribbean. In the Middle East and North Africa, the high growth in capital-labour ratios were a result of high rates of growth in overall ACS, while in Latin America and the Caribbean it appears that it was largely the result of slower growth in the agricultural labour force from 1980 to 20076. In Latin America and the Caribbean, capital labour ratios have grown steadily throughout the period, although at higher rates during the 1980s and 2000s, with a significant slow-down during the 1990s.

[6] The population working in agriculture expanded from 1980 until the late 1990s in Latin America and the Caribbean, after which point it decreased, over the entire period that population averaged an annual growth rate of zero.

Table 4: Level and growth of ACS, 1980–2007 (inventories-based estimates)

	Average ACS per agricultural worker 1980/07 (US$ 2005 constant)	Average annual rate of growth 1980/07 (%)		
		ACS	Agricultural worker	ACS per agricultural worker
World	4200	0.6	1.1	-0.5
High-income countries	63800	0.1	-2.8	2.9
Low & middle-income countries	2700	0.9	1.2	-0.3
Region				
East Asia and the Pacific	1100	1.7	1.1	0.6
Of which: China	700	1.5	1.1	0.4
East Asia and the Pacific excl China	2700	1.9	1.4	0.5
Latin America & Caribbean	15100	0.8	0[6]	0.7
Middle East and North Africa	9400	1.9	0.9	0.9
South Asia	1700	1.5	1.5	0.1
Of which: India	900	1.2	1.4	-0.3
South Asia excluding India	4500	1.8	1.6	0.2
sub-Saharan Africa	2400	1.5	2.2	-0.6

Source: FAOSTAT and FAO ACS database.

3.3 Compositions of ACS

According to the FAO data, globally the most significant components of ACS are (i) livestock; (ii) land development (iii) machinery and equipment, respectively. Each of these three components accounts for roughly a third of the total. The remainder consists of plantations and structure for livestock (Table 5).

However, the composition is radically different for the high-income and the low-and middle-income countries respectively (Table 5). For low- and middle-income countries, machinery, equipment and structures for livestock account for less than 15 percent of the total, while for the high-income countries this share is about 50 percent. Land development and livestock represent a far higher share of ACS in low- and middle-income countries than they do in high-income countries.

Table 5: Component shares in ACS inventories-based (%

Income groups	Components of ACS	1980	1990	2000	2007
World	Land development	30.1	30.8	32.4	31.8
	Livestock	35.2	34.1	33.3	33.9
	Machinery & equipment	23.1	23.5	22.1	21.9
	Plantation crops	6.0	6.5	7.1	7.4
	Structures for livestock	5.7	5.2	5.1	5.0
High-income countries	Land development	20.7	21.0	22.5	22.4
	Livestock	24.3	22.9	22.5	23.4
	Machinery & equipment	42.6	44.9	43.5	42.7
	Plantation crops	4.2	4.1	4.3	4.4
	Structures for livestock	8.2	7.1	7.2	7.2
Low- & middle-income countries	Land development	36.2	36.7	38.0	36.8
	Livestock	42.3	40.9	39.5	39.5
	Machinery & equipment	10.2	10.5	9.8	10.8
	Plantation crops	7.3	8.0	8.7	9.0
	Structures for livestock	4.0	4.0	4.0	3.9

Source: FAO ACS database

The national accounts-based data covers a broader range of agricultural assets than the inventories-based estimates and provides a different breakdown of components. These are: fixed capital (mostly machinery and equipment), livestock and tree stock. However, they partly confirm the patterns revealed by the inventories-based data, in that the share of fixed assets is much higher in the high-income than in the low-income countries (Table 6).

Table 6: Component shares of ACS national accounts-based (%)

Income Groups	Components in national accounts-ACS	1980	1990	2000	2005
World	Fixed capital	49.7	50.9	49.8	51.5
	Livestock	21.5	15.1	13.3	12.6
	Tree stock	28.8	34.0	36.9	35.9
High-income countries	Fixed capital	61.6	61.6	61.7	60.5
	Livestock	13.6	9.2	8.1	8.6
	Tree stock	24.8	29.2	30.2	30.9
Low- & middle-income countries	Fixed capital	24.7	24.3	24.2	28.5
	Livestock	38.5	30.4	25.1	26.4
	Tree stock	36.8	45.4	50.7	45.1

Source: FAO
Note: Only countries with complete data by ACS component for the whole period are included.

4. Sources of Financing Investment in Agriculture and their contribution to ACS

4.1 Public Investment

SPEED is the most comprehensive database on public agricultural investment. Public expenditure data of SPEED includes, among other things, public expenditure on salaries and purchase of goods and services that do not contribute to capital formation. Therefore, the entire volume of public expenditure cannot be counted as investment.

How much of public expenditure can be considered as capital investment is more of an empirical issue. According to the public expenditure reviews of a country (PER) of selected countries (Table 7), there is significant difference in the share of capital expenditures in total expenditures, ranging from as little as 9 percent in Tanzania to 84 percent in Laos and Mozambique. Table 7 below presents estimates for the most recent year. The simple average of the countries for which PER is available (Table 7) is about 46 percent. Taking this average as the mid-point, we could assume that 40–50 percent of public expenditure could be considered as investment for capital formation.

Table 7: Share of government expenditures in agriculture that represents investment in agricultural capital

Country	Capital share of agricultural expenditures	Year
Ghana (1)	53%	2007
Kenya (1)	28%	2008 – 2009
Mozambique (2)	84%	2007
Nigeria (3)	36%	2005
Tanzania (4)	9%	2010 – 2011
Uganda (4)	22%	2008 – 2009
Zambia (1)	24%	2000
Laos (5)	84%	2004 – 2005
Philippines (6)	26%	2005
Viet Nam (1)	75%	early 2000s
Honduras (7)	66%	2006
Simple average	46%	

Sources: (1) Akroyd and Smith, 2007. (2) World Bank, 2011a. (3) World Bank, 2008. (4) World Bank, 2011b. (5) Cammack, Fowler and Phomdouangsy, 2008. (6) World Bank, 2007. (7) Anson and Zegarra. 2008.

4.2 Private sector Investment

Investment is generally measured as incremental change in capital stock (ΔK) from one period to other. The value of the yearly deprecation of agricultural capital that needs to be replaced plus the yearly change is a proxy to estimate of investment. The following equation $I_t = K_t - K_{t-1}(1-\delta)$ is used to compute investment using inventory-based capital stock , where K_t is current agricultural capital stock, K_{t-1} is previous year capital stock, δ is capital depreciation rate (5%)[7], i.e. 5% of the ACS in the previous period need to be replaced. I_t is current year capital investment. It = It public +It private. Therefore, we can calculate private investment as: It private = It -It public.

[7] The rate of depreciation of different assets of 5 percent is problematic because not much in terms of information about assets depreciation is available.

Table 8 gives the proportion of total investment made by the private and public sector, assuming 40 percent of public expenditure is capital investment, which was estimated for 54 low- and middle-income countries whose public expenditure data are available in SPEED. The results show that the bulk of the investment for capital formation is made by the private sector.

Table 8: Sources of investment for capital formation at farm level, assuming 40 percent of public expenditure as capital investment (%)

Region/Country groupings	Sources of capital investment	2005	2006	2007
East Asia and Pacific (9)	Public	35	41	**53**
	Private	65	59	**47**
Europe and Central Asia (9)	Public	15	16	**14**
	Private	85	84	**86**
Latin America and Caribbean (11)	Public	10	9	**12**
	Private	90	91	**88**
Middle East & North Africa (7)	Public	19	17	**16**
	Private	81	83	**84**
South Asia (7)	Public	8	10	**11**
	Private	92	90	**89**
sub Sahara Africa (11)	Public	7	5	**4**
	Private	**93**	**95**	**96**

Source: Computed using SPEED and FAO database

Table 9 gives the proportion of total investment made by the private and public sectors, assuming 50 percent of public expenditure is capital investment. The results show that, even if we assume that 50 percent of public expenditure is on capital goods, the bulk of the investment for capital formation is still made by the private sector.

Furthermore, several country studies found that the corporate private sector investment does not make up a large part of investment in agricultural production. This is partly confirmed by the small amount of FDI relative to the total agricultural capital stock, which is presented below. From these findings, it is considered that farmers themselves are the main source of investment for farm level capital formation.

Table 9: Sources of investment for capital formation at farm level, assuming 50 percent of public expenditure as capital investment (%)

Region/Country groupings	Sources of capital investment	2005	2006	2007
East Asia and Pacific	Public	45	51	65
(9)	Private	55	49	35
Europe and Central Asia	Public	19	20	18
(9)	Private	81	80	82
Latin America and Caribbean	Public	13	11	15
(11)	Private	87	89	85
Middle East & North Africa	Public	23	21	19
(7)	Private	77	79	81
South Asia	Public	11	13	14
(7)	Private	89	87	86
sub Sahara Africa	Public	9	8	9
(11)	Private	91	92	91

Source: Computed using SPEED and FAO database.

4.3. Official Development Assistance (ODA)

ODA is a significant component of overall resources for most of the developing countries. ODA, by and large, is committed through the public sector[8] and could be counted as public expenditure. In view of this, it is assumed that 40–50 percent of ODA is investment for capital formation. Using the FAO EAA dataset, Table 10 gives ODA, assuming 40 percent contribution to capital formation, as a percentage of total investment for ACS. As the result shows, its contribution to capital formation is very small across all the regions. The assumption of 50 percent as capital investment does not alter much its relative contribution to total investment.

Table 10: Percentage of ODA in farm level ACS

Region/Country groupings	2005	2006	2007
East Asia and Pacific (9)	0.5	0.2	**0.6**
Europe and Central Asia (9)	0	0	**0**
Latin America and Caribbean (11)	0.4	0.4	**0.4**
Middle East & North Africa (7)	0.9	0.9	**0.9**
South Asia (7)	0.8	0.5	**1.3**
sub Sahara Africa (11)	**1.7**	**1.7**	**3.2**

Source: FAO EAA dataset

4.4. Foreign Direct Investment

FDI is often referred to as a major potential and growing source of finance for agricultural development and investments in agriculture. However, because of the lack of comprehensive information, arriving at exact and comprehensive estimates of FDIs is very difficult.

According to the UNCTAD dataset, FDI inflow to the agriculture sector (agriculture, hunting, forestry and fishing) increased significantly from US$1.9 billion in 2006 to more than US$6 billion in 2007 and 2008 before decreasing to US$4.7 billion in 2009 mainly because of the economic crisis (Figure 1). However, even at the peak in 2008 the value (US$6.8 billion) was still significantly small compared to FDI flow to the food sector (food, beverages and tobacco), which stood at US$91.7 billion.

The share of agricultural FDI in total FDI is very low: In 2008, it was 0.7 percent at global level and varied between 0.07 percent for high-income countries and 2.9 percent for low-income countries, whereas that of FDI inflow to the food sector at global level was 9.8 percent and it varied between 13 percent for high-income countries and 1.5 percent for low-income countries (Tables 11 and 12). The share of FDI inflow to the food sector to total FDI is much higher than the share of agricultural FDI in total FDI, except in low-income countries.

In total, FDI has played a minor role in the primary agriculture sector compared to the food industry. Considering the value of FDI into the agriculture sector relative to the size of agricultural capital stock, it is assumed that its contribution to capital formation has been insignificant.

[8] Some ODAs are also committed through the civil society organizations and the NGOs. However, there is no available data on how much is channeled through the public sector and how much through the NGOs/CSO.

Figure 1: FDI inflows to agriculture, hunting, forestry and fishing

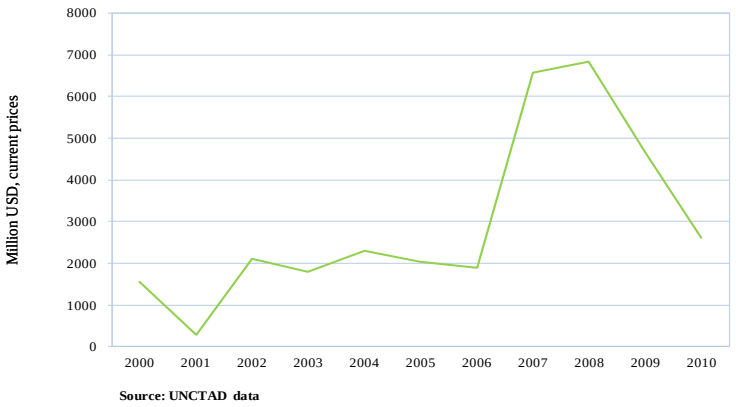

Table 11: FDI inflows to agriculture, hunting, forestry and fishing (by income category in 2008 in current US$ million)

Income category	Country No.	Agriculture FDI	Total FDI	Ag FDI/Total FDI
High	17	377.5	580 099.7	0.07%
Upper middle	25	5 561.5	375 247.2	1.48%
Lower middle	15	697.0	39 372.4	1.77%
Low	10	192.1	6 527.7	2.94%
TOTAL	67	6 828.1	1 001 247.0	0.68%

Source: UNCTAD and author's calculations using UNCTAD data.

Table 12: FDI inflows to food, beverages and tobacco (by income category in 2008 in current US$ million)

Income category	Country No.	Food FDI	Total FDI	Food FDI/Total FDI
High	21	79 437.3	606 666.3	13.09%
Upper middle	13	12 003.3	317 051.6	3.79%
Lower middle	5	243.5	8 291.6	2.94%
Low	2	28.3	1 901.5	1.49%
TOTAL	41	91 712.5	933 910.9	9.82%

Source: UNCTAD and author's calculations using UNCTAD data.

5. Country Level Analysis of Trend, Composition and Sources of Investment in Agriculture

Analysis of FAO data on ACS at global and regional levels, as done earlier in Sections 3 and 4, reveals that:

- Poorer countries have lower ACS per agricultural worker; and
- Farmers themselves are the main source of investment for farm level capital formation.

The finding that poorer countries have lower ACS, and consequently higher level of poverty, hunger, as well as lower per capita income have been demonstrated by several authors (von Cramon-Taubadel *et al.*, 2009; FAO, 2012d).

A more striking result, as reported in the State of Food and Agriculture 2012, is that agricultural capital stock per worker has grown at an average rate of 1 percent per year since 1990 in the 29 countries that are on track to achieve the MDG hunger reduction target, but it has grown much more slowly in the 31 countries where progress has been insufficient and it has fallen in the 17 countries where undernourishment rates have stagnated or regressed.

The finding that the farmers (domestic) are the main investors at farm level ACS is also significant as it calls for emphasis on mobilizing domestic resources. In view of this, more in-depth analysis of country level data were carried out for a group of selected countries from Asia, Africa and Latin America. The countries selected are: Bangladesh, Burkina Faso, Bolivia, Ethiopia, Indonesia, Malawi, Malaysia, Mali, Republic of Korea, South Africa and Zambia. Table 13 gives some of the socio-economic indicators of the countries selected.

Table 13: Socio-economic indicators

Country	Agriculture, value added (% of GDP)[1] 2000–07	GDP per capita (constant 2000 US$)[2] 2000–07	Percentage of undernourishment in total pop[3] 2000–08	HDI[4] ranking 2007
Ethiopia	46.0	142	44.5	171
Mali	37.4	242	15	178
Malawi	34.9	151	28.5	160
Burkina Faso	33.3	236	10	177
Zambia	22.5	346	43.5	164
Bangladesh	21.8	415	28	146
Bolivia	14.6	1 049	24.5	113
Indonesia	14.5	872	14	111
Malaysia	8.9	4 342	<5*	66
Republic of Korea	3.7	13 129	<5*	26
South Africa	3.3	3280	n.a.	129

Sources: [1] WDI; [2] WDI; [3] FAOSTAT; [4] UNDP. The Human Development Index (HDI) is a summary measure of human development. It measures the average achievements in a country in three basic dimensions of human development: a long and healthy life (health), access to knowledge (education) and a decent standard of living (income).
*MDG Indicator, 2000–06

Table 14 below reports agricultural capital stock per worker in the selected countries. Burkina Faso has the lowest level of capital stock to labour ratio, followed by Bangladesh and Ethiopia. South Africa has the highest level of ACS to labour ratio. Its annual average for the period 1980–2007 ACS to labour ratio was about US$27 855, ten times more than Malaysia, 6.7 times more than Republic of Korea. The K/L ratio is very small in Burkina Faso, Bangladesh and Ethiopia, the countries with low per capita income and high level of poverty, compared to South Africa, with Korea and Malaysia.

Table 14: Agricultural capital stock-labour ratio (K/L) per agricultural worker (in US dollars)

	1980/89	1990/99	2000/07	1980/07
Bangladesh	1 634	1 618	1 717	1 648
Bolivia	7 883	6 612	5 668	6 795
Burkina Faso	1 285	1 403	1 551	1 401
Ethiopia	2 013	1 547	1 479	1 689
Indonesia	2 393	2 388	2 511	2 420
Malawi	2 374	2 304	2 101	2 274
Malaysia	1 903	2 618	2 999	2 461
Mali	3 261	3 186	3 539	3 306
Rep. Korea	1 468	3 962	7 899	4 109
South Africa	26 133	27 136	31 216	27 855
Zambia	2 243	1 912	1 706	1 972

Source: Computed base on FAO ACS database.

Though South Africa had the highest annual average level of ACS-labour ratio, annual average growth rate is more pronounced in the Republic of Korea. In the Republic of Korea, the K/L ratio grew by 14 percent during 1980–1984. Mali and Bangladesh had a negative growth rate in the sub-period 1980–1989. It was positive in the 1990s and grew significantly during 2005–2007 (Table 15).

Table 15: Growth rate of capital-labour ratio (K/L)

	1980/89	1990/99	2000/07	1980/07
Bangladesh	-0.9	0.3	1.5	0.2
Bolivia	-0.7	-2.8	-0.1	-1.3
Burkina Faso	2.2	0.8	0.8	1.3
Ethiopia	-1.9	-2.2	2.0	-1.0
Indonesia	-1.4	0.4	1.2	0.1
Malawi	1.3	-0.7	-1.0	-0.2
Malaysia	3.6	2.0	2.2	2.6
Mali	-2.7	1.0	1.7	0.0
Rep. Korea	9.8	11.0	7.8	9.4
South Africa	-0.3	1.0	1.9	0.8
Zambia	-1.6	-1.1	-1.1	-1.2

Source: Computed based on FAO ACS database

The results indicate that countries that have higher growth of ACS had higher per capita GDP and lower prevalence of undernourishment in total population.

5.1. Sources of Investment for Capital Formation in the selected countries

For the selected countries, using the methodology discussed earlier, level of public and private investment as percentage of total investment were calculated, assuming 40 percent of public expenditure is capital investment (Table 16). The results show that the bulk of the investment for capital formation is made by the private sector, by farmers themselves. The share of private investment ranges from 60 percent in the Republic of Korea to more than 99 percent in Bolivia. Even if it is assumed that 50 percent of public expenditure is capital investment, the share of private investment (on-farm investment) does not change much (Table 17).

Table 16: Share of private investment in on-farm investment, assuming 40% of public expenditure as capital investment (%)

Country	1981/90	1991/00	2001/07
Bangladesh	93.8	91.4	92.3
Bolivia	99.6	99.5	99.2
Ethiopia	99.1	96.3	99.0
Indonesia	97.1	96.3	98.5
Rep. Korea	60.5	66.0	52.1
Malawi	98.6	98.7	99.2
Zambia	90.7	98.8	95.5

Table 17: Share of private investment in on-farm capital formation, assuming 50% of public expenditure as capital investment (%)

	1981/90	1991/00	2001/07
Bangladesh	92.2	89.2	90.1
Bolivia	99.5	99.4	99
Ethiopia	99	98.6	98.8
Indonesia	96.4	95.4	98.1
Rep. Korea	50.7	57.5	40.1
Malawi	98.3	98.3	99.1
Zambia	88.3	98.5	94.3

5.2. FDI in agriculture at country level

We have noted earlier that at aggregate level FDI in agriculture has been relatively small. However, agricultural development depends on the simultaneous growth of agricultural production and the value chains to which it is linked. These value chains include a wide range of small- and large-scale activities that involve supplying farm inputs, processing, storing, distributing, wholesaling, retailing and exporting farm products, which we shall refer to collectively as "agro-industry".[9] As countries develop, agricultural production increasingly has to be marketed and processed to supply rapidly urbanizing populations and industries.

[9] See J.H. Davis and R.A. Goldberg (1957), *A Concept of Agribusiness*, Harvard Business School, Boston. Or see: J.E. Austin (1983), *Agroindustrial project analysis*, EDI Series in Economic Development, The World Bank, Washington D.C.

With rising incomes and urbanization, people also diversify their diets into a wider range of higher value foods, including fresh perishable foods and processed and pre-cooked foods. Farmers also gradually adopt more capital intensive methods of farming to supply these growing markets, and this tends to be associated with greater access to modern inputs such as fertilizers, pesticides, improved seeds and machines. As the value chains between farmers and consumers lengthen with urbanization and as countries develop, the value-added share of agro-industry in the national economy soon overtakes that of primary agriculture. As such, growth in agricultural investment and production depends on sufficient complementary investment in agro-industry, where the role of FDI becomes important.

In view of these, some selected country case studies were conducted to assess the relative importance of FDI in agriculture. Tables 18, 19 and 20 provide data for Cambodia, Thailand and Brazil respectively. In Cambodia, which is a low-income country, FDI into agriculture accounts for a larger share than FDI into the food sector that is negligible. Whereas in Thailand and Brazil, which are middle-income countries, FDI into agriculture accounts for only a small share in total FDI and is much smaller than FDI into the food sector.

Table 18: FDI in agriculture in Cambodia (million US dollars)

	2000	2005	2006	2007	2008	2009	Annual change 2005–09
Total FDI	160	684	2373	1345	6866	2101	32.39%
Agriculture (% of Total)	1.3 (0.81%)	9.1 (1.33%)	232 (9.78%)	273 (20.30%)	74 (1.08%)	573 (27.27%)	181.69%
Food processing (% of Total)				10.8 (0.80%)	0	0	

Source: Cambodia case study, carried out by the Cambodia Development Resource Institute (CDRI), 2012.

Table 19: FDI in agriculture in Thailand (Baht million)

	2000	2005	2006	2007	2008	Annual change 2005–08
Total FDI	256282	740717	1274047	857203	697567	-1.98%
Agriculture (% of Total)	34 (0.01%)	686 (0.09%)	387 (0.03%)	252 (0.03%)	606 (0.09%)	-4.05%
Food processing (% of Total)	4288 (1.67%)	8484 (1.15%)	18571 (1.46%)	17336 (2.02%)	18432 (2.64%)	29.52%

Source: Thailand case study, carried out by Waleerat Suphannachart and Nipawan Thirawat, Facultry of Economics, Kasetsart University, Thailand, 2011.

Table 20: FDI in agriculture in Brazil (million US dollars)

	2003	2004	2005	2006	2007	2008	Annual change 2005–08
Total FDI	10100	18100	15100	18800	34600	45100	44.01%
Agriculture, livestock (% of Total)	170.5 (1.69%)	166.3 (0.92%)	210.2 (1.39%)	176.1 (0.94%)	316.9 (0.92%)	498.1 (1.10%)	33.32%
Food and beverage (% of Total)	409.4 (4.05%)	5345.5 (29.53%)	2074.8 (13.74%)	739.3 (3.93%)	1816.7 (5.25%)	2238.2 (4.96%)	2.56%

Source: Central bank of Brazil.

6. Concluding remarks and observations

Increasing investment is essential for increasing agricultural production and productivity. In order to increase investment and to formulate evidenced based policy to promote investment, it is critical to know what has been the level and pattern of investment in agriculture in the past. However, data and information on agricultural investment and capital stocks are still inadequate for evidenced based policy formulation. Most of the available datasets are largely estimates based on certain methodology and do not provide data on investment based on clearly defined concept and definition. An area that is characterized by complete lack of comprehensive data are investments by the local/national corporate sector in primary agriculture and in the value chains. Hence, empirical analysis of investments in agriculture is seriously hampered by the very limited availability of data

FAO ACS dataset, though, is the most comprehensive in terms of country, and temporal coverage has its own caveats. ACS measures only the most tangible forms of investment by farmers (i.e. land improvement, plantations, structures for livestock, machinery and equipment, and livestock). Because it excludes other forms of investment (for example, education, training and participation in social networks), it probably represents a lower bound estimate of farmers' investments.

Analysis of the available data clearly shows that (i) farmers are by far the largest investors in agriculture. Annual investment in on-farm ACS is three times higher than the investment made by the public sector, the corporate sector including FDI and donor assistance; (ii) the countries that have higher growth of per capita ACS had higher per capita GDP and lower prevalence of under- nourishment in total population; (iii) the composition of ACS is radically different for the high-income and the low- and middle-income countries respectively. For low- and middle-income countries, machinery, equipment and structures for livestock account for less than 15 percent of the total, while for the high-income countries this share is about 50 percent. Land development and livestock represent a far higher share of ACS in low- and middle-income countries than they do in high-income countries.

Improved data would significantly enhance the possibility of analysis of agricultural investments. Improvements could cover different dimensions: improved comparability and consistency in data, improved country coverage and more up-to-date information, inclusion of areas not yet covered by data or estimates. Better coordination and collaboration between different institutions collecting data in similar or related areas could help. Some specific areas for improvement are the following.

Agricultural capital stock: Existing data has broad country coverage; however, the set of assets covered is significant but not complete, and the methodology applied cannot account for improvements in quality of assets. Alternative estimates based on national accounts are to date only possible for a limited number of the low- and middle-income countries.

Government expenditure: Data compiled by IFPRI provide the most comprehensive information of low-and middle-income countries, but country coverage is not complete. There is also discrepancy between this data and data from other sources for specific countries. Harmonization and improvement of data on public expenditures could lead to better and more comprehensive data for analytical purposes. Also a better break-down of agricultural expenditures and more information on how much they contribute to capital formation would improve the basis for analysis. Similarly a break-down of expenditures between rural and urban areas for types of non-agricultural investments that are strongly supportive of agriculture would also be important for analysis.

Foreign Direct Investment: Our knowledge on FDI flows to agriculture is particularly weak. Available data is limited, inconsistent over time and far from comprehensive. One issue is the lack of coverage of many investments by large institutional investors such as mutual funds, equity funds, pension funds, which appear to be growing.

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