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Agricultural investments and capital stock 2012–2022

Global and regional trends

HIGHLIGHTS

- **The global net capital stock in agriculture, forestry and fishing recorded USD 6.5 trillion in 2022, steadily increasing from USD 4.8 trillion in 2012.**
- **The global gross fixed capital formation in agriculture, forestry and fishing grew from USD 476 billion in 2012 to USD 597 billion in 2022 (in constant 2015 prices), at an average annual rate of 2.3 percent.**
- **From 2020 to 2022, the global gross fixed capital formation in agriculture, forestry and fishing increased in all regions at an average annual rate of 2.9 percent, with the highest growth rate in Oceania (5.7 percent) and Europe (5.2 percent) and the lowest in Asia (1.9 percent).**
- **Compared to the previous decade, the Americas and Asia show the highest increase in the agricultural investment ratio, reaching 19.8 percent and 14.1 percent respectively, indicating a rising trend in the capitalization of the agricultural sector.**

CAPITAL STOCK

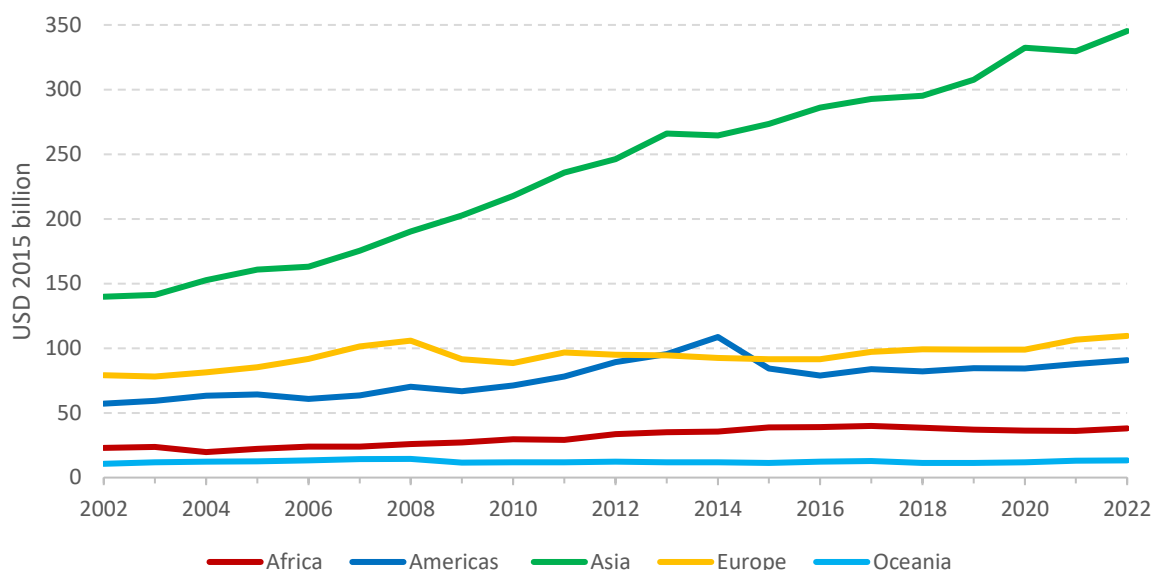
GLOBAL AND REGIONAL

Global gross fixed capital formation (GFCF) in agriculture, forestry and fishing measures the annual flows of physical investment in the agricultural sector. At the global level, it recorded an increase from USD 476 billion in 2012 to USD 597 billion in 2022. Such an increase represents an annual average growth of 2.3 percent, which is lower than during the previous decade (3.9 percent) (Figure 1).

Asia recorded the highest annual average growth in the last decade (3.4 percent), from USD 246 billion to USD 345 billion of GFCF in agriculture, forestry and fishing. Europe and Africa followed with an average annual growth of 1.4 percent and 1.3 percent, respectively, corresponding to an increase from USD 95 billion to USD 110 billion (Europe) and from USD 34 billion to USD 38 billion (Africa). The increase in Oceania was much smaller, from USD 12.2 billion to USD 13.3 billion (0.8 percent per year on average), while the Americas exhibited very low growth during the period, from USD 89 billion to USD 91 billion (0.2 percent per year on average).

Looking at the most recent years (2020–2022), the variation in gross fixed capital formation in agriculture, forestry and fishing presents a different picture. At the global level, the annual average growth is 2.9 percent, higher than the trend of the last decade. Such a trend is sustained by Oceania, Europe and the Americas where the annual average growth is estimated at 5.7 percent, 5.2 percent and 3.7 percent, respectively, far ahead of Africa and Asia (2.3 percent and 1.9 percent, respectively). These values hide a drastic reduction in the agricultural investments between 2020 and 2021 due to the COVID-19 pandemic restrictions: the global GFCF in agriculture, forestry and fishing increased by 1.7 percent only, which is much lower than the growth recorded in both the previous year (4.5 percent) and the following year (4.1 percent).

Figure 1: Gross fixed capital formation in agriculture, forestry and fishing by region



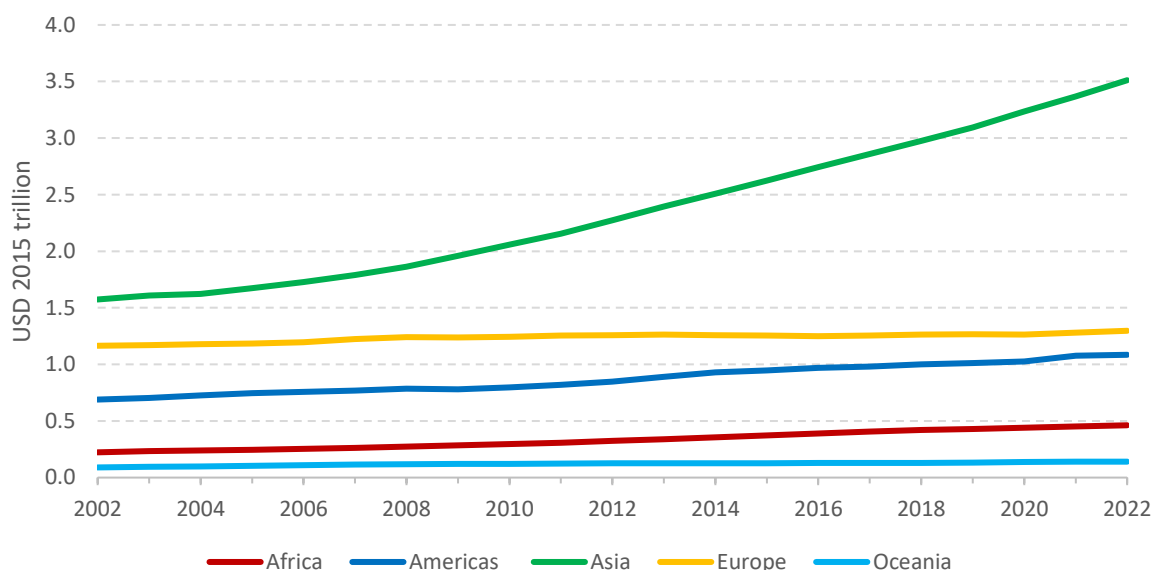
Source: FAO. 2023. Capital stock. In: *FAOSTAT*. Rome. [Cited December 2023]. <https://www.fao.org/faostat/en/#data/CS>

The global net capital stock in agriculture, forestry and fishing increased from USD 4.8 trillion in 2012 to USD 6.5 trillion in 2022, corresponding to an average annual growth of 3 percent, higher than in the previous decade (2.4 percent) (Figure 2).

Asia and Africa recorded the highest increase of net capital stock between 2012 and 2022, from USD 2.3 trillion to USD 3.5 trillion (corresponding to an average annual growth of 4.4 percent) and from USD 0.32 trillion to USD 0.46 trillion (3.6 percent), respectively. The Americas and Oceania followed, showing increases from USD 0.84 trillion to USD 1.1 trillion (2.5 percent) and from USD 0.13 trillion to USD 0.14 trillion (1.2 percent), respectively. Europe has the second largest net capital stock among all regions, but its increase from USD 1.26 trillion to USD 1.3 trillion (0.3 percent) during the period is the lowest.

In the last three years, the growth of the global net capital stock in agriculture, forestry and fishing was 3.2 percent on average, which is in line with the trend of the last decade. This growth is led by Asia, recording an annual average growth of 4.2 percent. The growth in the other regions is below the global average: 2.8 percent and 2.4 percent in the Americas and Africa, respectively, while Europe (1.3 percent) and Oceania (1.1 percent) lag behind.

Figure 2: Net capital stock in agriculture, forestry and fishing by region



Source: FAO. 2023. Capital stock. In: *FAOSTAT*. Rome. [Cited December 2023]. <https://www.fao.org/faostat/en/#data/CS>

The agricultural investment ratio (AIR) is defined as the share of agriculture GFCF in agriculture value added. At the global level, the AIR increased from 15.4 percent in the 2002–2011 decade to 16.1 percent in the 2012–2022 decade. In the last three years, the AIR was 15.8 percent on average, which is stable compared with the 2017–2019 period (15.7 percent) (Table 1).

The agricultural investment ratio shows different decadal patterns at the regional level, with notable increases in Asia and the Americas from 12.1 percent in 2002–2011 to 14.1 percent in 2012–2022 and from 18.1 percent to 19.8 percent, respectively. The AIR in Europe has been stable around 30 percent, while decreases are recorded in Africa and Oceania, from 10.6 percent to 9.9 percent and from 32.1 percent to 26.2 percent, respectively.

Compared to 2017–2019 period, the agricultural investment ratio in 2020–2022 shows slow increasing trends in all regions except Asia. The AIR dropped between 2020 and 2021 in Africa, Asia and Oceania, and rebounded in 2022 except in Oceania, while in the Americas and Europe the AIR increased both in 2021 and 2022. This pattern is a direct consequence of drops in investments during the COVID-19 pandemic.

Europe is the region with the highest homogeneity of capitalization across countries, with an average AIR above 30 percent in the last decade. The level of gross fixed capital formation in agriculture, forestry and fishing is more heterogeneous in the other regions, especially the Americas and Asia where the agricultural sector, on average, is less capital-intensive despite the high level of investments.

Table 1: Average annual agricultural investment ratio by region (percent)

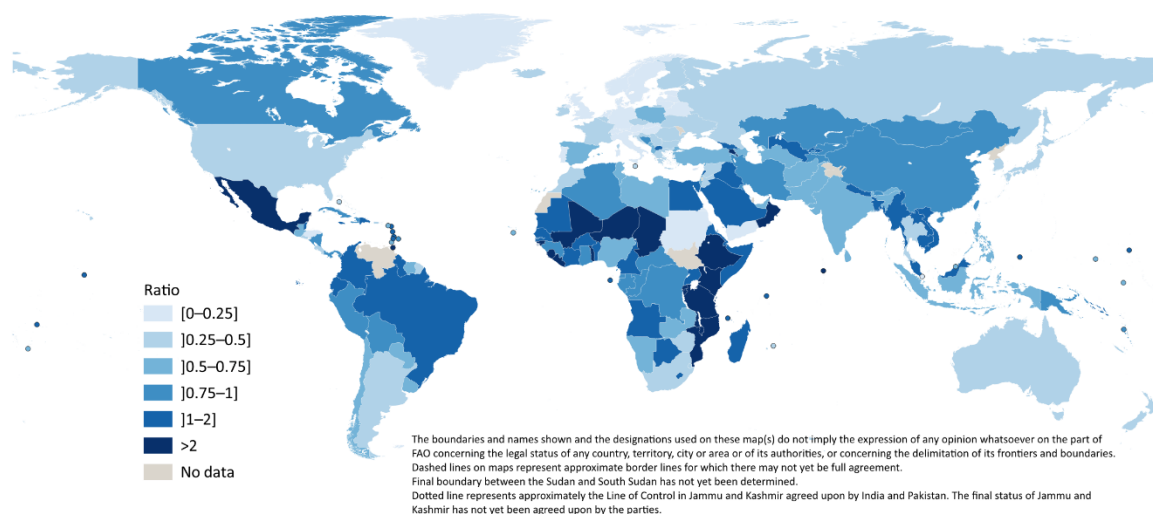
	2017–2019	2020–2022	2002–2022	2002–2011	2012–2022
Africa	9.86	10.22	10.22	10.58	9.89
Americas	17.80	18.98	18.98	18.06	19.81
Asia	13.89	13.14	13.14	12.10	14.08
Europe	29.86	30.09	30.09	30.02	30.15
Oceania	27.83	28.98	28.98	32.08	26.15
World	15.70	15.80	15.80	15.41	16.14

Source: Based on FAO. 2023. Capital stock. In: *FAOSTAT*. Rome. [Cited December 2023]. <https://www.fao.org/faostat/en/#data/CS>

COUNTRY

The ratio of the agriculture value added to net capital stock measures the contribution of one unit of capital stock to generate value added in agriculture, forestry and fishing. From 2012 to 2022, on average, the ratio is below one in high-income and upper middle-income countries, as shown in Figure 3, implying that capital contributes more than labour to the generation of agricultural value added. Therefore, the agricultural sector in these countries tends to be more capital-intensive than in lower middle-income and lower-income countries.

Figure 3: Ratio of agriculture value added to net capital stock, 2012–2022 average



Source: Based on FAO. 2023. Capital stock. In: *FAOSTAT*. Rome. [Cited December 2023]. <https://www.fao.org/faostat/en/#data/CS> based on UN Geospatial. 2020. Map geodata [shapefiles]. New York, USA, UN.

Compared with high- and upper middle-income countries, lower middle-income countries show a notable variability over time in the value added to net capital stock ratio, and the variability is even larger for lower-income countries. This indicates that the capitalization of the agricultural sector improves over time with net capital stocks growing faster than the value added in agriculture. Examples include Liberia and Ethiopia, where the value added to net capital stock ratio decreased from an average of 3.9 and 3 in 2012–2014 to 1.9 and 1.7 in 2020–2022, respectively.

In contrast, the value added to net capital stock ratio is less variable over time in high- and upper middle-income countries, meaning that the growth rates of value added and capital stock in agriculture are positively correlated, and that the level of capitalization in agriculture is stable. For example, Luxemburg, Switzerland and Austria show the lowest levels of variability and a flat trend for the value added to net capital stock ratio.

EXPLANATORY NOTES

The Food and Agriculture Organization of the United Nations (FAO) Capital Stock domain reports on aggregate physical investment flows and capital stock in agriculture, forestry and fishing for 195 countries and territories from 1995 to 2022. Variables contained in the database are the gross fixed capital formation (GFCF), the net (or wealth) capital stock (NCS) and the consumption of fixed capital (CFC), measured according to the methodological and computational concepts of the System of National Accounts (SNA) 2008. Whenever available, the database integrates official national accounts data harvested from the United Nations Statistics Division (UNSD) or the Organisation for Economic Co-operation and Development (OECD).

Only a subset of the member countries reports official data on all required variables for the reference period of the dataset. When information is not available, or is only partially available from official sources, missing data are estimated. Agricultural investment flows are computed from time series of agricultural investment-to-value-added ratios, available from previous research programmes held at the World Bank and at FAO. The time series on agricultural capital stock results from the application of the perpetual inventory method (PIM) to agricultural investment flows. Time series showing missing data are integrated with exogenous information.

According to the System of National Accounts 2008, capital stock is defined as the *value of all fixed assets in use*, where fixed assets are described as produced assets (i.e., excluding land) that are used repeatedly in the agricultural production process for more than one year. Capital stock series can be assessed as *net* or *gross*. Gross capital stock measures the value of all the fixed assets in use based on at the price of new assets, regardless of the age. That is, gross stocks ignore the depreciation of fixed assets, and consider past investments as new, taking into account only the retirement. Net capital stocks, instead, correspond to the value of gross capital stock minus depreciation; that is, the cumulative value of consumption of fixed capital. The decline in the value of fixed assets occurs due to physical and economic deterioration, where the latter includes obsolescence. Based on these criteria, estimates of agricultural net capital stocks are obtained through the PIM.

The PIM allows estimating agricultural capital stock and consumption of agricultural fixed capital starting from a time series of agricultural gross fixed capital formation. In particular, agricultural net capital stock is modelled as a sum of the past investments in agricultural fixed assets that are still in use after correcting for depreciation. The agricultural net capital stock for country i at the end of period t , $NCS_{i,t}$, can be written as a function of agricultural net capital stocks at the end of previous period, $NCS_{i,t-1}$, of agricultural gross investment in the current period, $GFCF_{i,t}$, and of consumption of agricultural fixed capital, $CFC_{i,t}$:

$$NCS_{i,t} = NCS_{i,t-1} + GFCF_{i,t} - CFC_{i,t}$$

When $GFCF$ is missing, estimation procedures are applied to gauge it from the Agricultural Investment Ratio (AIR), which is defined as

$$AIR_{i,t} = \frac{GFCF_{i,t}}{VA_{i,t}}$$

where $VA_{i,t}$ is the agricultural value added for country i in year t . Therefore, the AIR represents $GFCF$ as a share of VA in agriculture, which indicates how much of the total factor income is reinvested in new fixed assets.

A thorough description of the methodology employed to obtain the capital stock data published in FAOSTAT is available from Vander Donckt and Chan (2019).

REFERENCES

United Nations Statistics Division. 2008. System of National Accounts 2008 (2008 SNA). In *unstats.un.org* [online]. <https://unstats.un.org/unsd/nationalaccount/sna2008.asp>

Vander Donckt, M. & Chan, P. 2019. *The new FAO global database on agriculture investment and capital stock*. FAO Statistics Working Paper 19-16. Rome. <http://www.fao.org/3/ca6133en/ca6133en.pdf>

Vander Donckt, M., Chan, P. & Silvestrini, A. 2021. A new global database on agriculture investment and capital stock. *Food Policy*, 100, 101961. <https://www.sciencedirect.com/science/article/pii/S0306919220301652>

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