

Soil Health and the Food Value Chain

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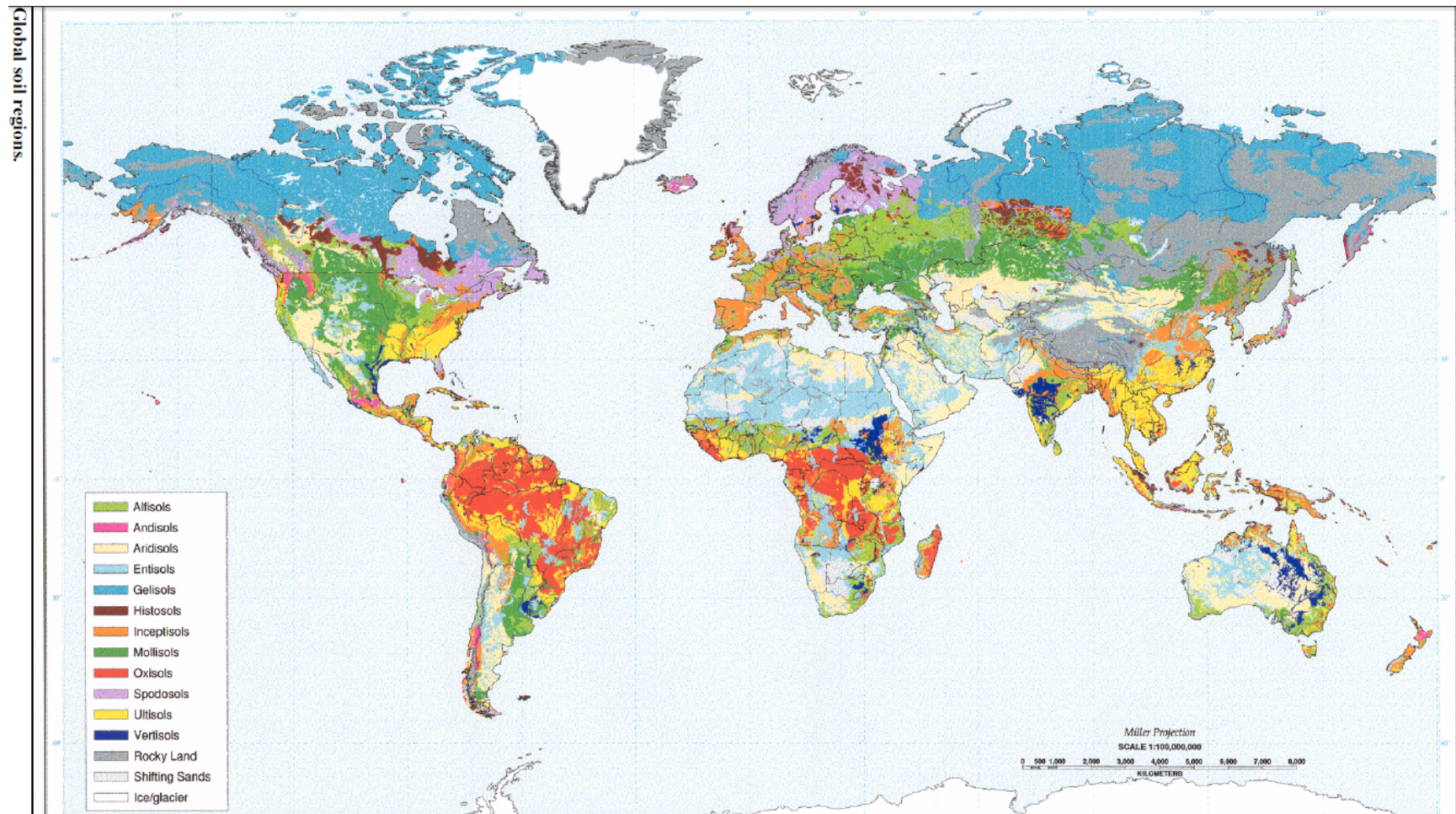
27th Conference of the Working Community of Danube
Region Countries

Soil Health and Food: Innovate, Demonstrate, Communicate
Sept. 8th, 9th, 2020

Global land (150 million km²)

- Estimates of global soils
 - compiled from various sources
 - Forest ecosystem (34 million km² forest ecosystems)
 - Threat of deforestation
 - » Estimate of annual 100.000 km² loss
 - » <http://www.globalchange.umich.edu/globalchange2/current/lectures/deforest/deforest.html>
 - Dryland (70 million km², arid, semiarid, dryhumid)
 - Threat of desertification
 - » <http://www.fao.org/docrep/007/y5738e/y5738e06.htm>
 - Arctic land and glaciers (20 million km² cryosphere)
 - No pedogenesis
 - » <http://en.wikipedia.org/wiki/Cryosphere>
 - Agricultural used land 16,5 million km²
 - » USDA estimate 2001
 - » http://www.iiasa.ac.at/Research/LUC/External-World-soil-database/HWSD_Documentation.pdf
 - Urban land areas 2,2 million km²
 - » Annual increase 1970 to 2000 was 58.000km²
 - » Most likely number in 2030 4 million km²
 - » Seto et. al. 2011,
<http://www.plosone.org/article/info:doi/10.1371/journal.pone.0023777>

Global Soil Types (Source: USDA 2001)



Fluvial sediments indicate floods



Ökosystem Services in extensiver
Berglandschaft: Biodiversität

Ecosystem Services in extensive Mountain Region: Protection

Verlassene Wohnstätte in Sfistofca, Rumänien

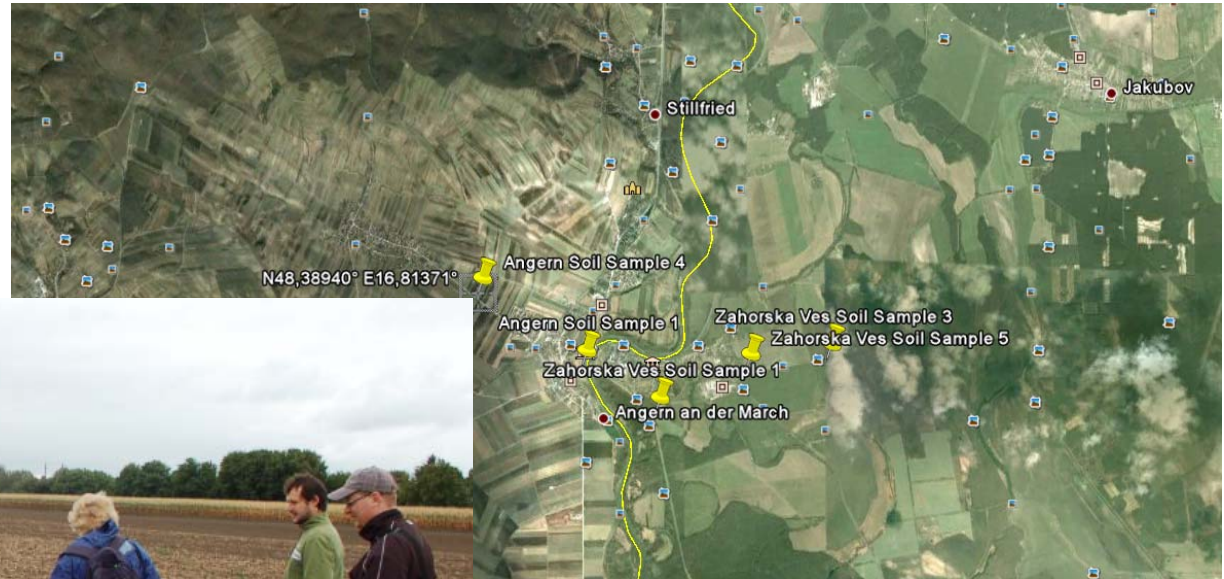


Breiling M. 2010, "Landscape Planning in the Danube Region", in Danube News 21, Bulletin of the International Association for Danube Research, pp. 11-13, June 2010, Wilhering, Austria. ISSN 2070-1292



Die Verlassenen verlieren weiter

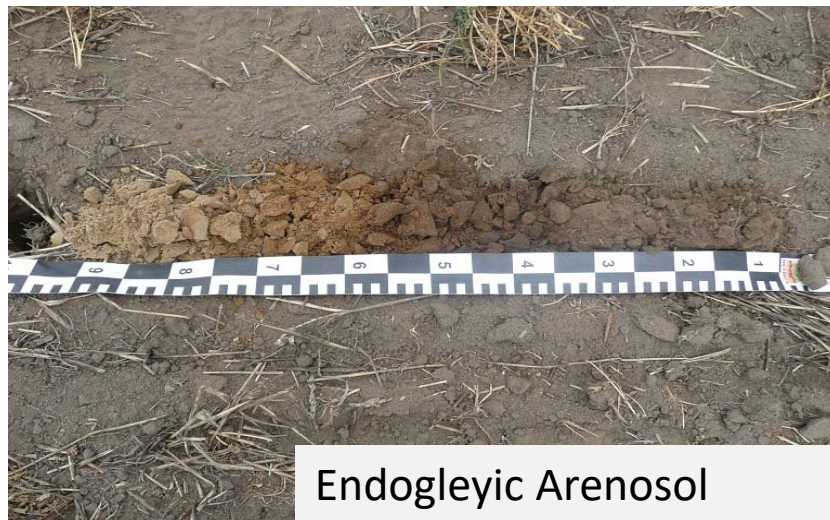
Taking soil samples in project area: 4 points of investigation in each country



Analysis of soil profiles in Austria



Analysis of soil profiles in Slovakia



Flood event of 2006 from the air





Soil is in many ways a key element in landscape

- To grow food
- As a building material

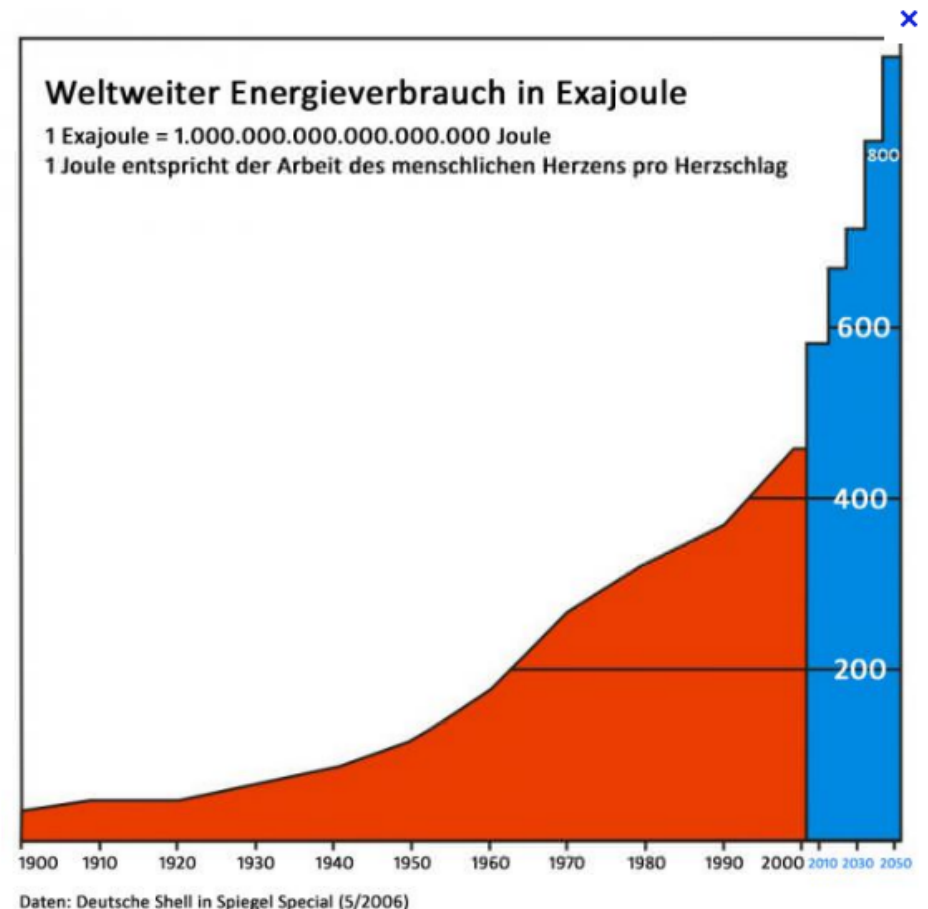
Soil & Water Interaction

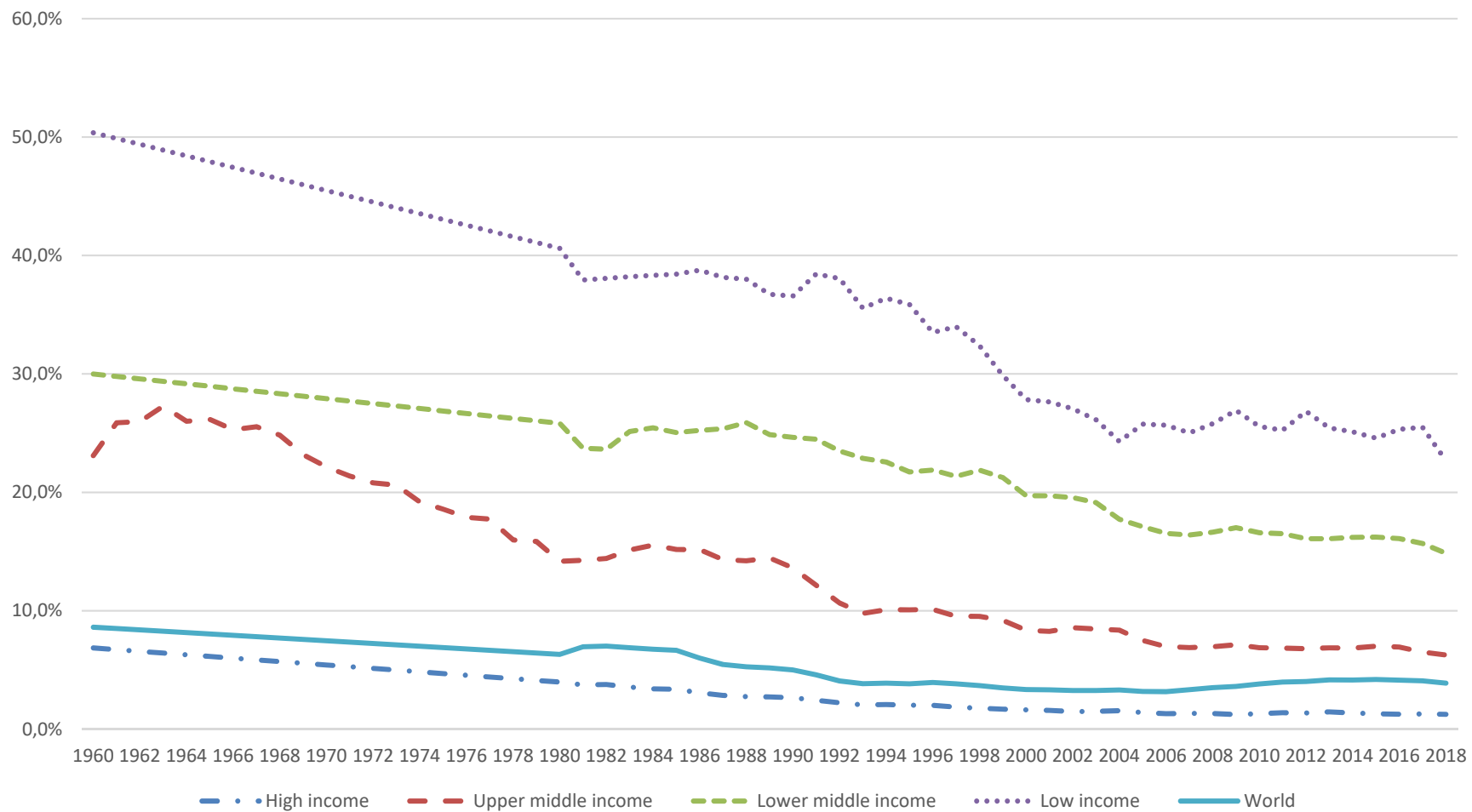
- Irrigation
- Drainage
- Soil moisture regime



Soil & Energy Interaction

- The energy demand to cultivate one unit of land increased in orders of magnitude
- Soils are an important sink for greenhouse gases
 - Carbon sequestration
 - Permafrost soils contain immobilized greenhouse gases

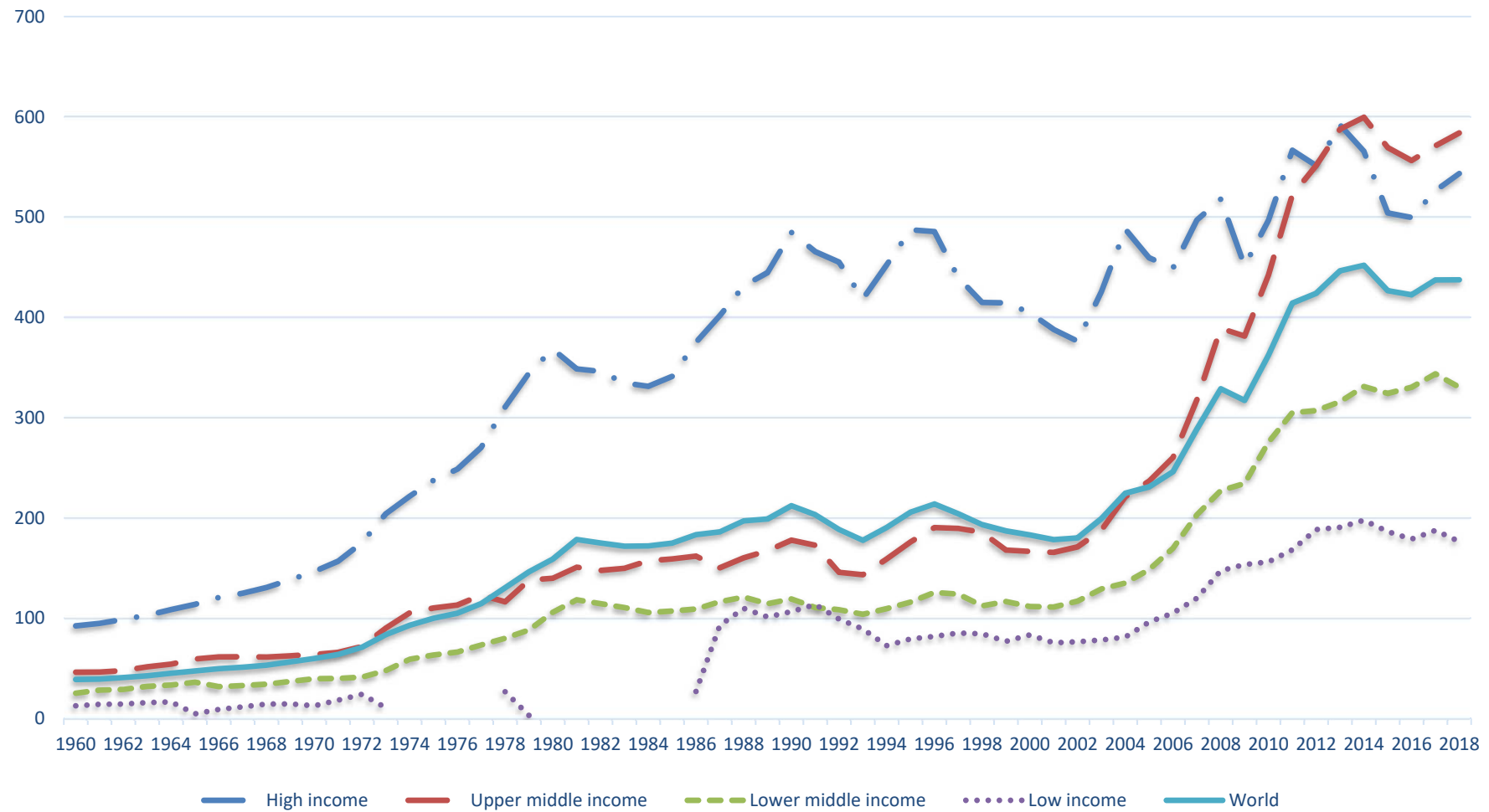




Source: World Bank 2019, UNDESA 2019, author interpolation for missing values during 1960 to 1980

Figure 5: Added Value by Agriculture as per cent Share of GDP in Economic Groups of Countries

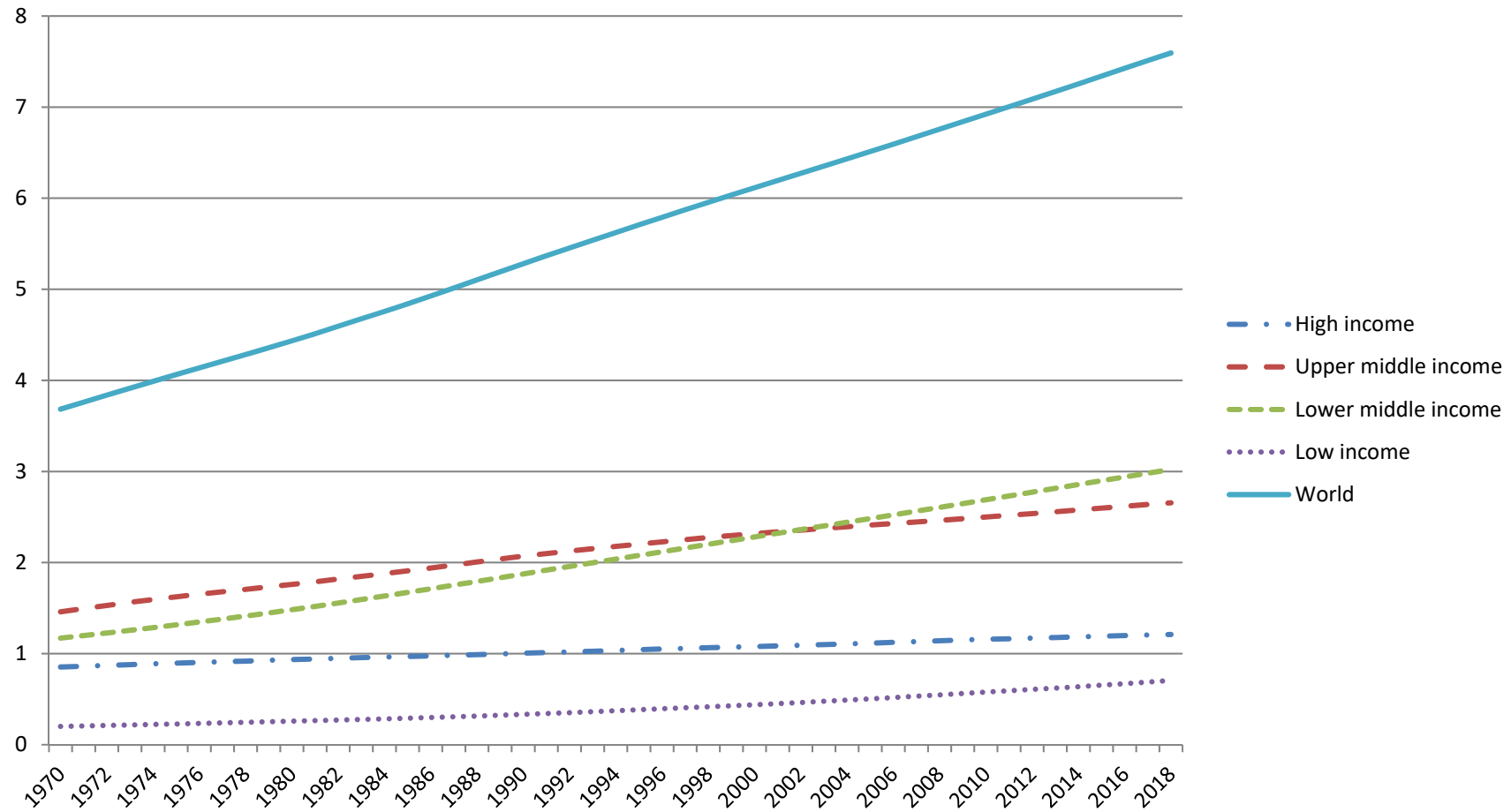
Per Capita Value Agriculture 1960-2018



Source: World Bank 2019, UNDESA 2019, author calculation

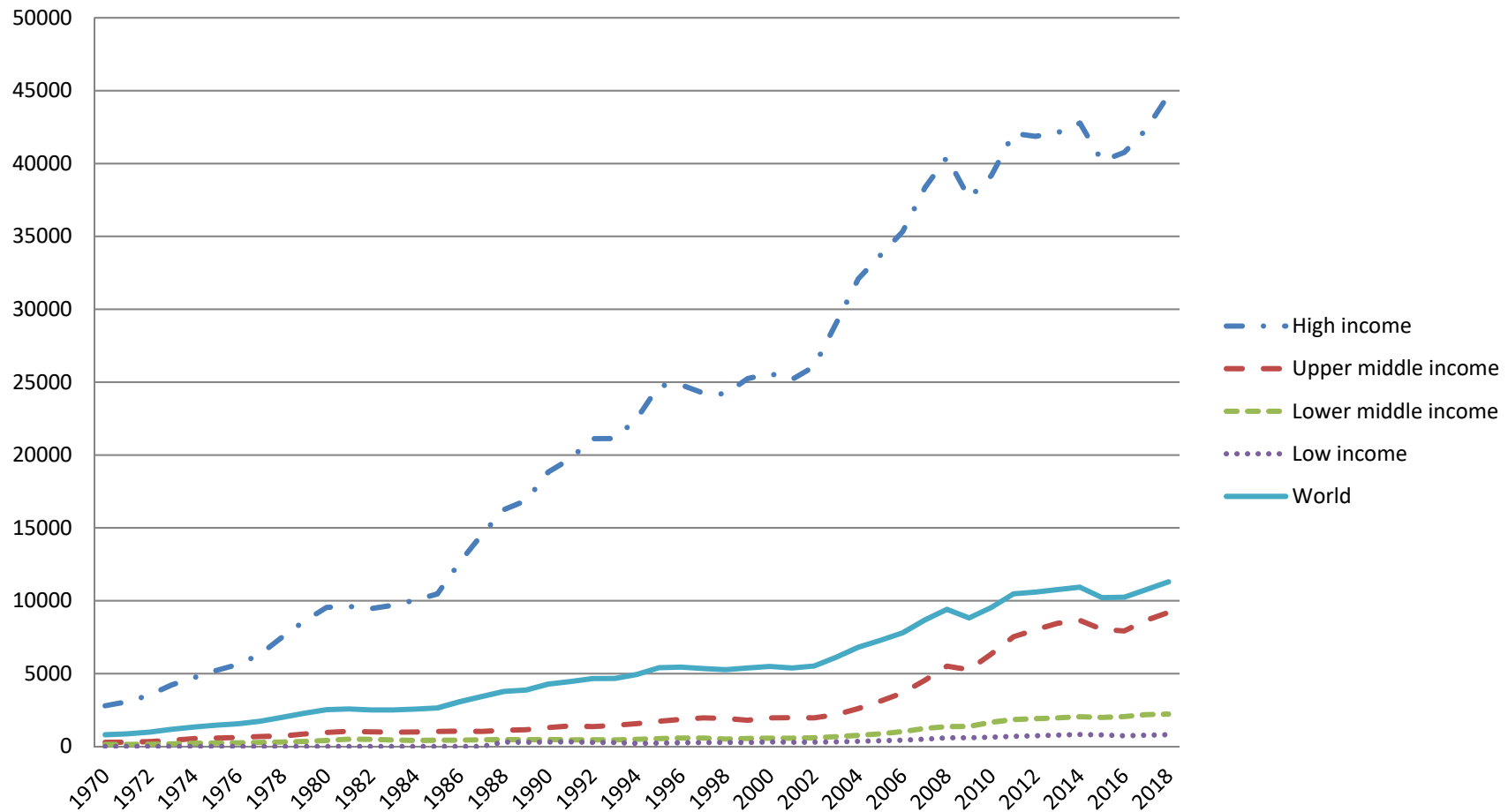
Figure 5: Added Value Due to Agriculture in current USD per person

Global Population 1970 to 2018



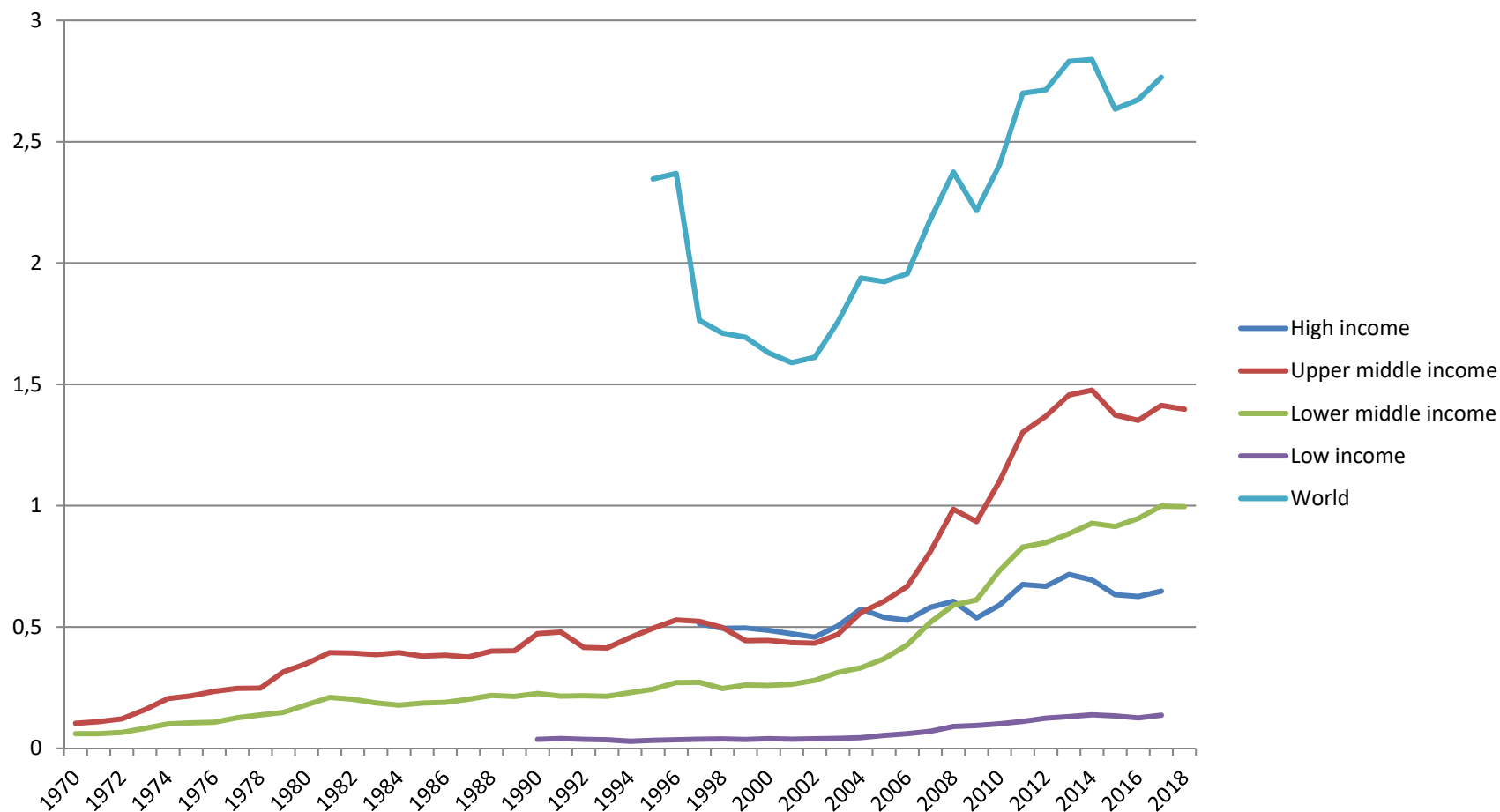
Source World Bank: World Development Indicators
Last Updated: 09/19/2019

GDP per Person in current USD 1970 to 2018

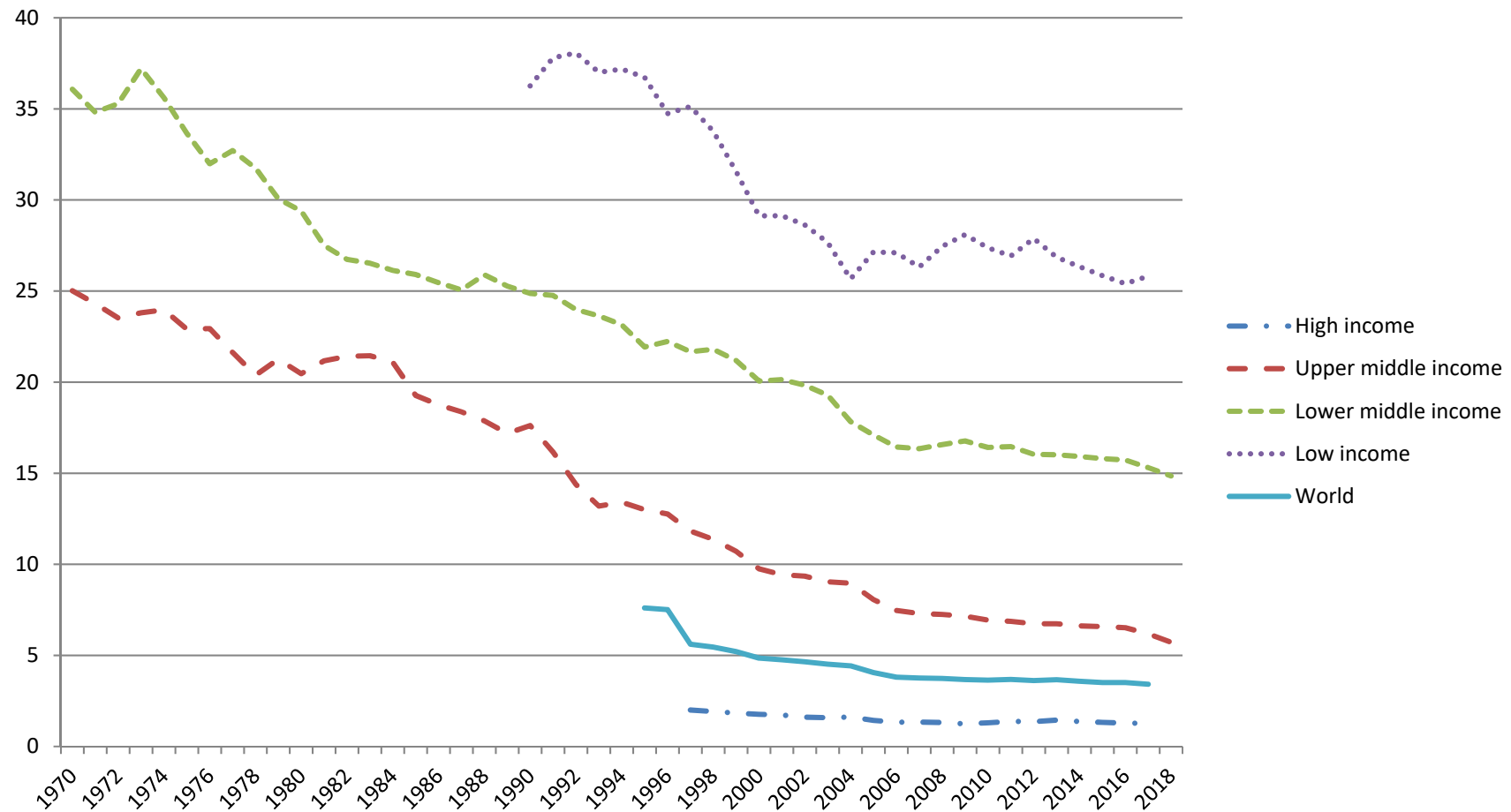


Source World Bank: World Development Indicators
Last Updated: 09/19/2019

Value of Agriculture, Forestry and Fishery in GDP during 1970 to 2018

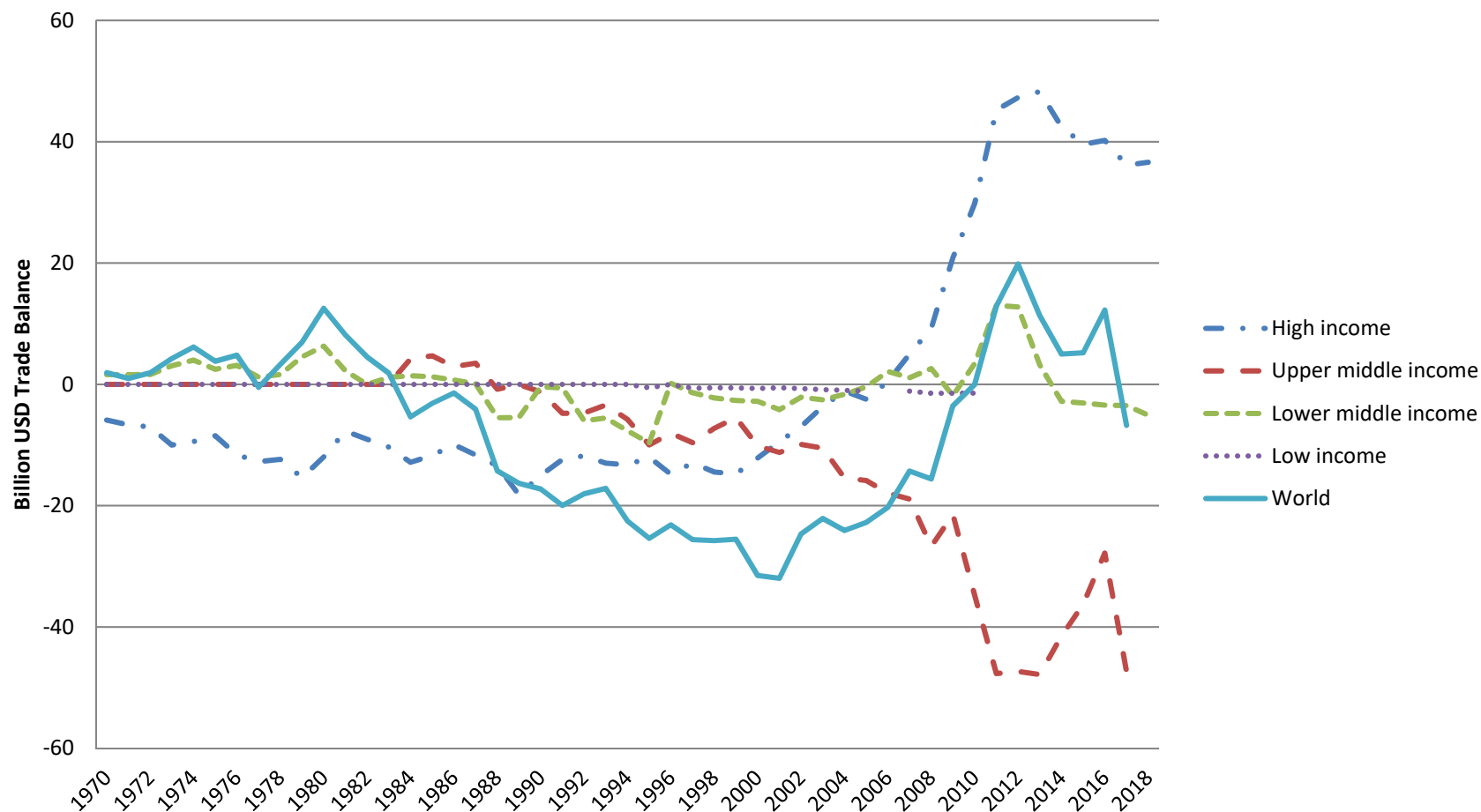


Share of Agriculture, Forestry and Fishery in GDP during 1970 and 2018



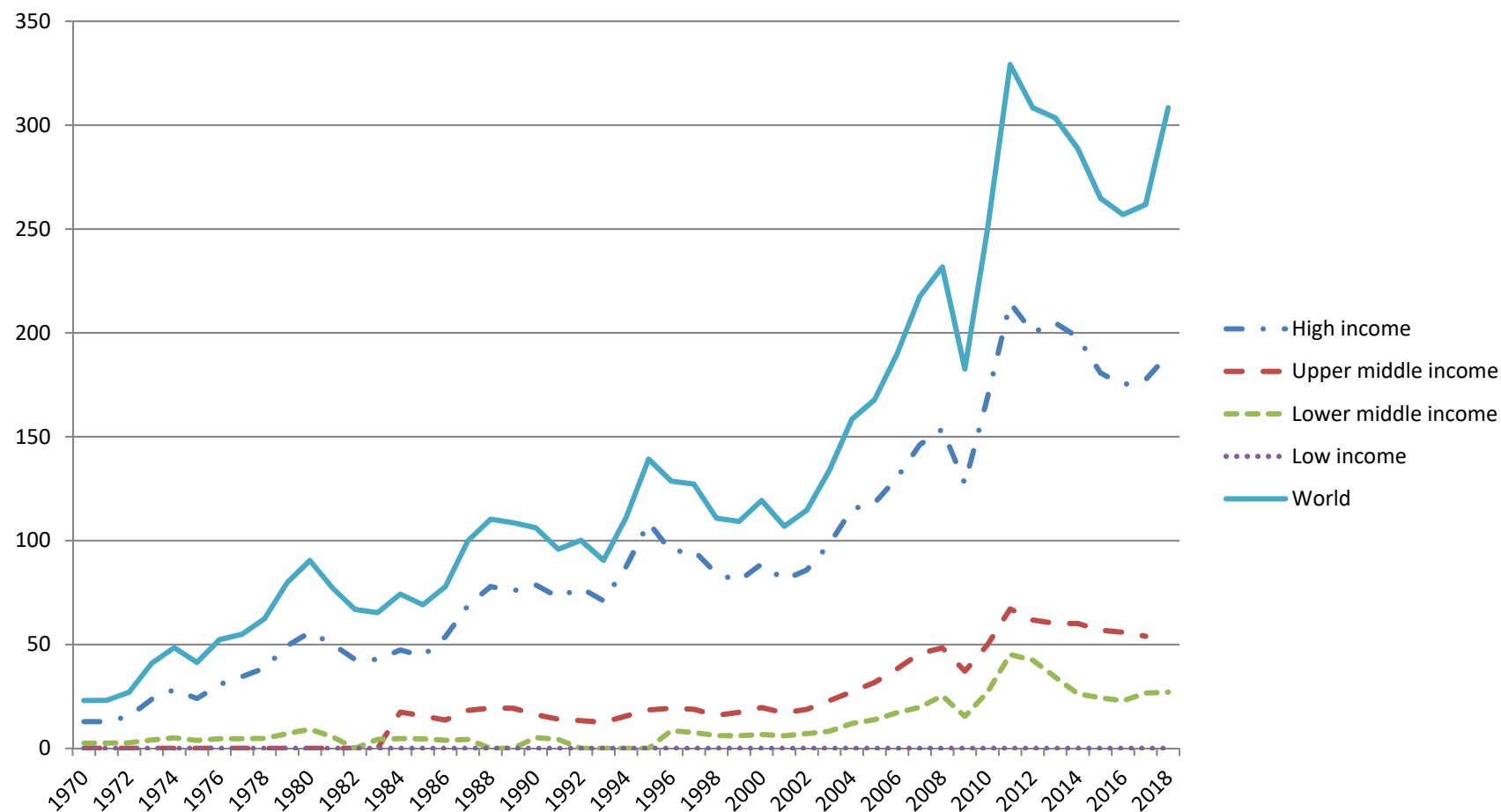
Source World Bank: World Development Indicators
Last Updated: 09/19/2019

Trade Balance Agricultural Raw Products Exports minus Imports in Billion (current) USD



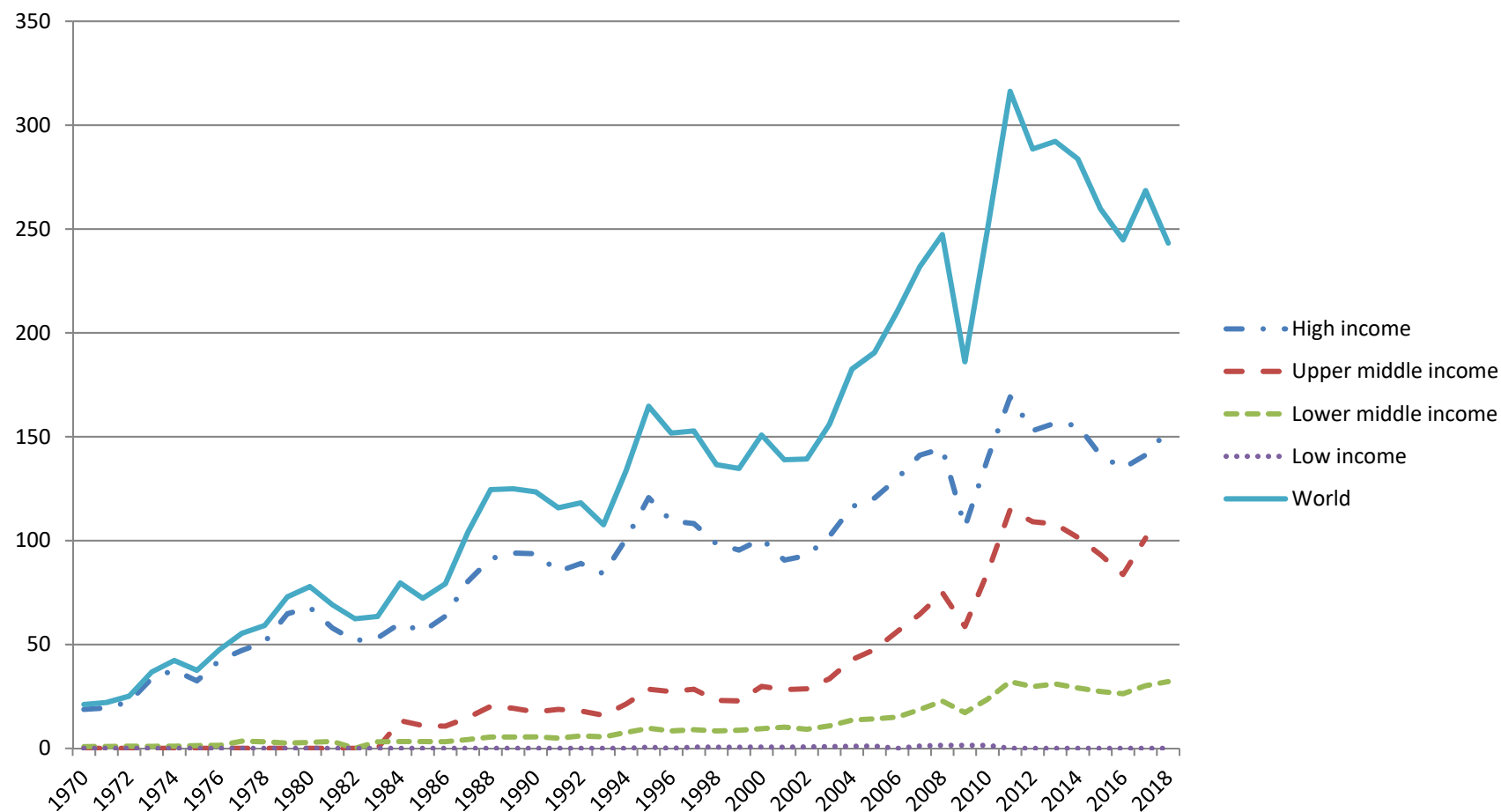
Source World Bank: World Development Indicators
Last Updated: 09/19/2019

Agricultural Raw Products Exports in Billion current USD – 1970 to 2018



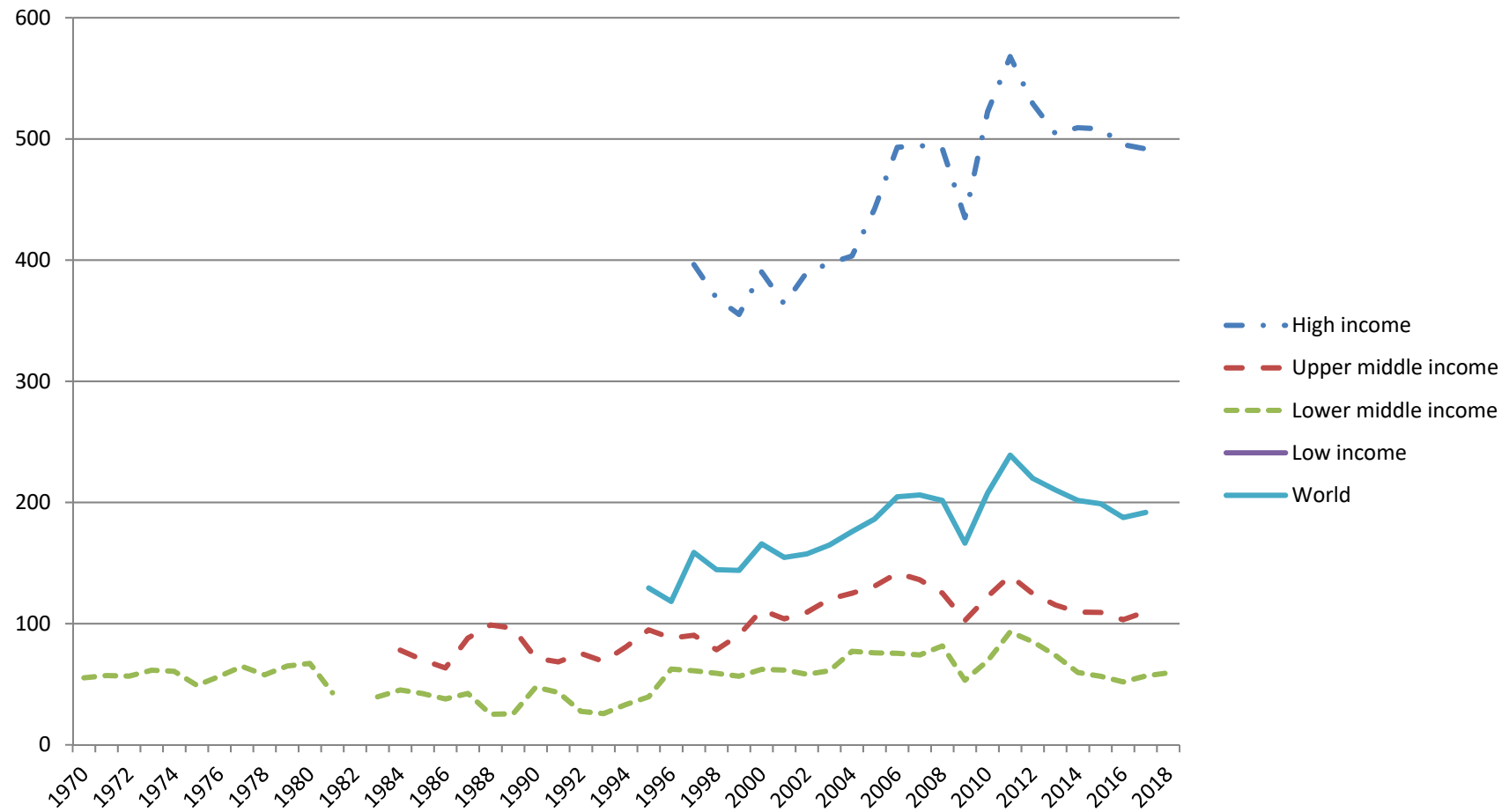
Source World Bank: World Development Indicators
Last Updated: 09/19/2019

Agricultural Raw Products Imports in Billion current USD – 1970 to 2018

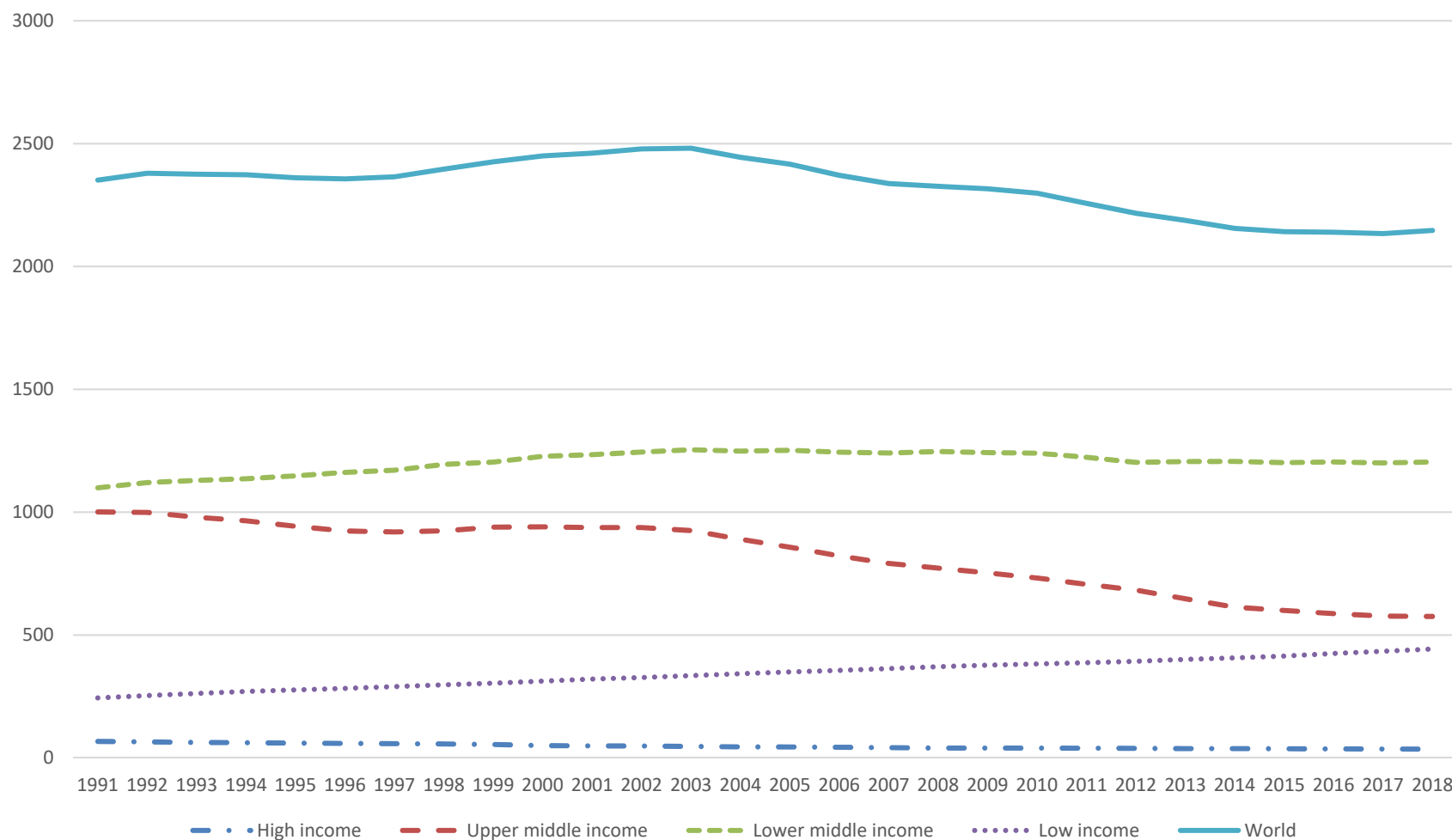


Source World Bank: World Development Indicators
Last Updated: 09/19/2019

Trade Ratio Agricultural Raw Products (Exports plus Imports) as % of GDP in Agriculture

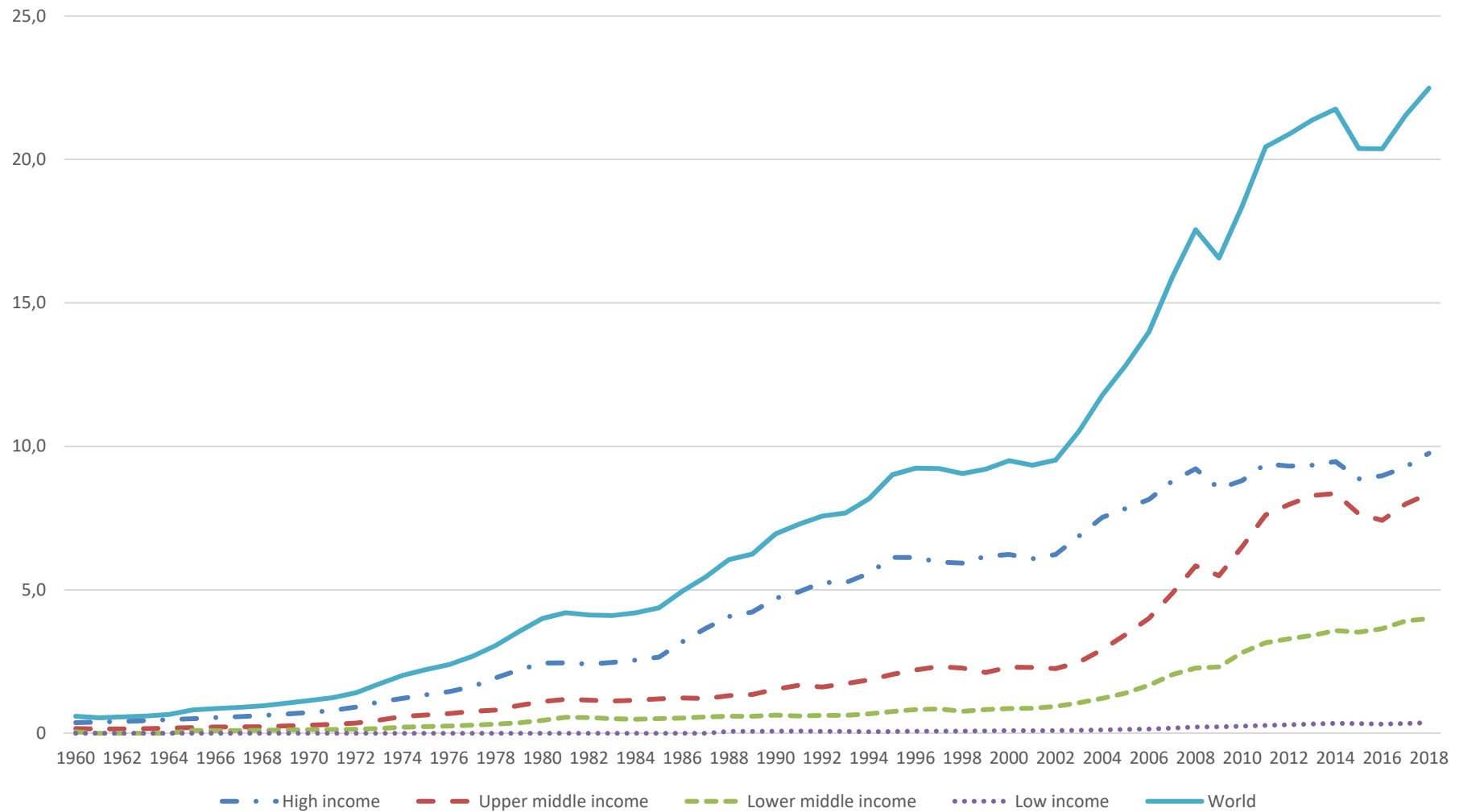


Population Dependent on Agriculture in Million 1991-2018

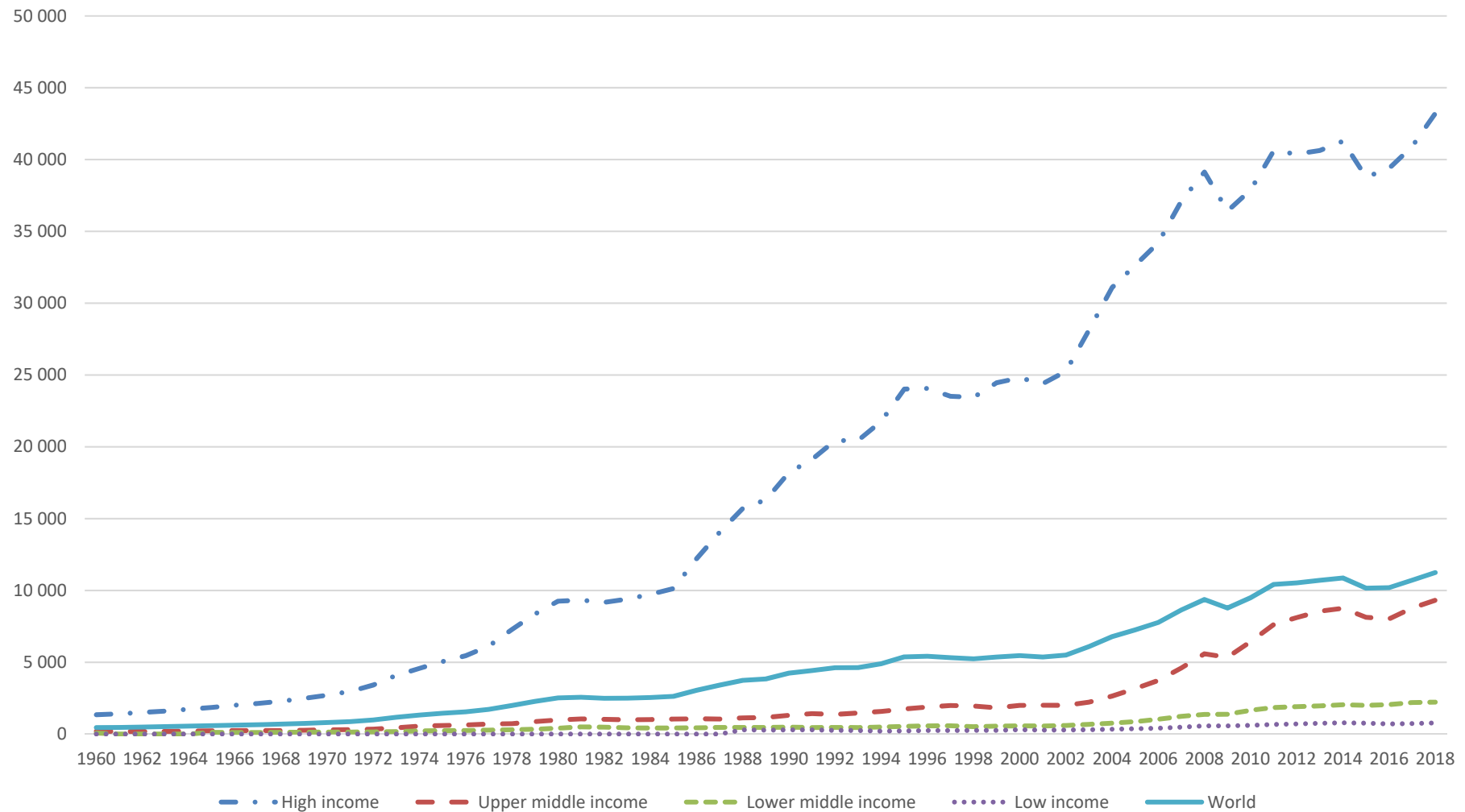


Source World Bank: World Development Indicators
Last Updated: 09/19/2019, based on ILO

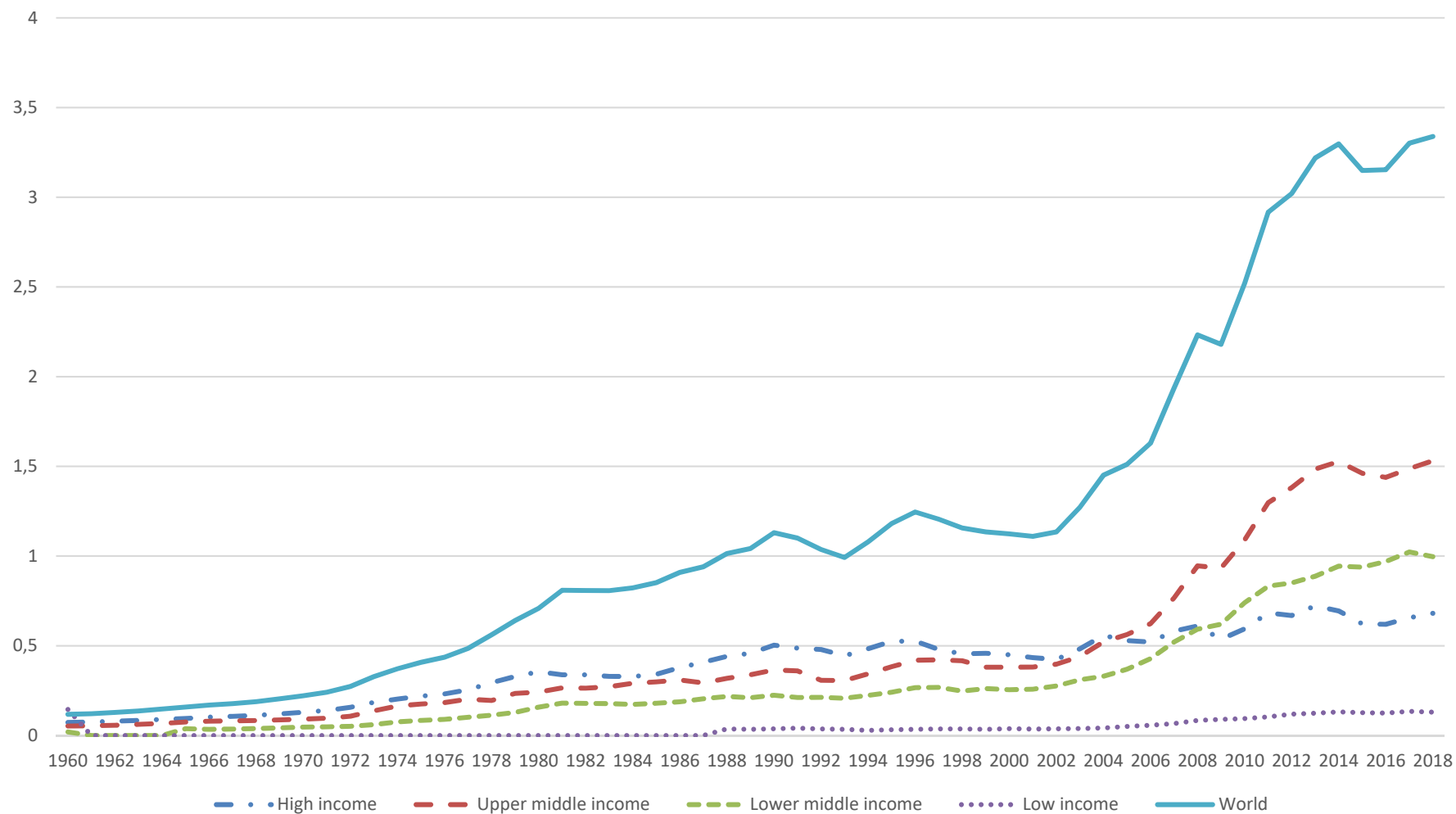
Rural GDP – Upper Estimate



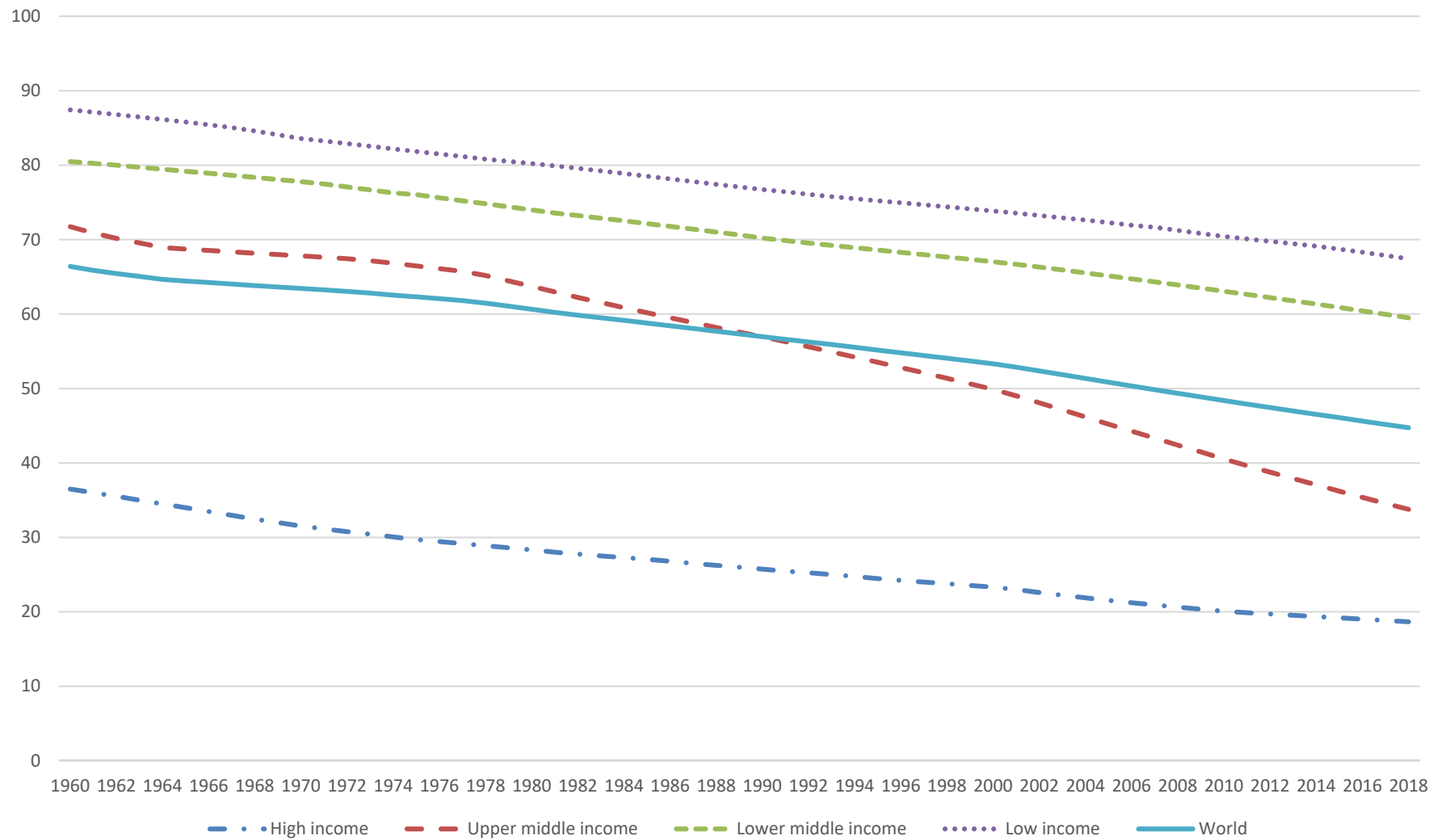
Per Capita GDP in Current USD



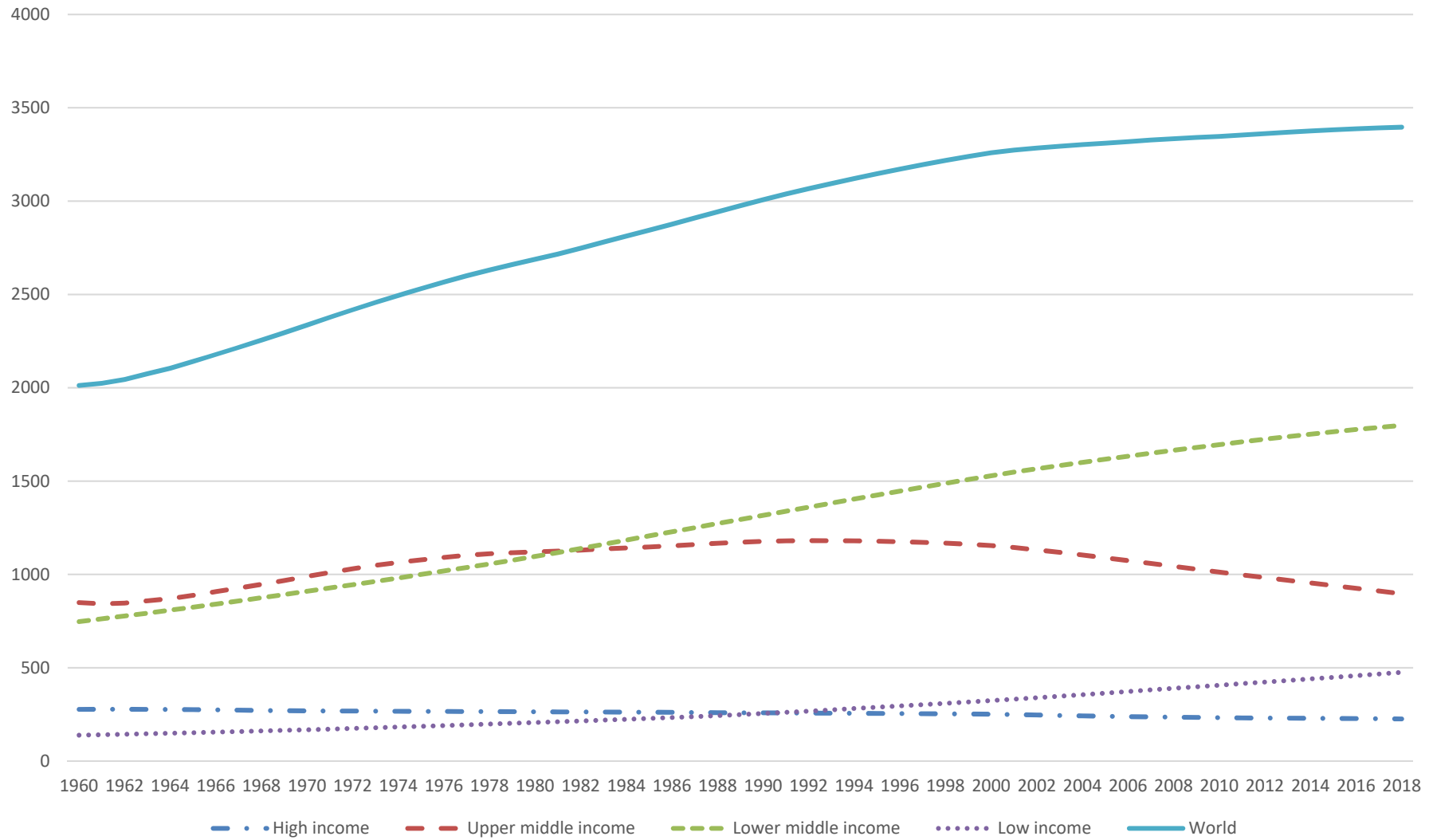
Agriculture Value as Lower Border of Rural GDP in Trillion Current USD 1960-2018



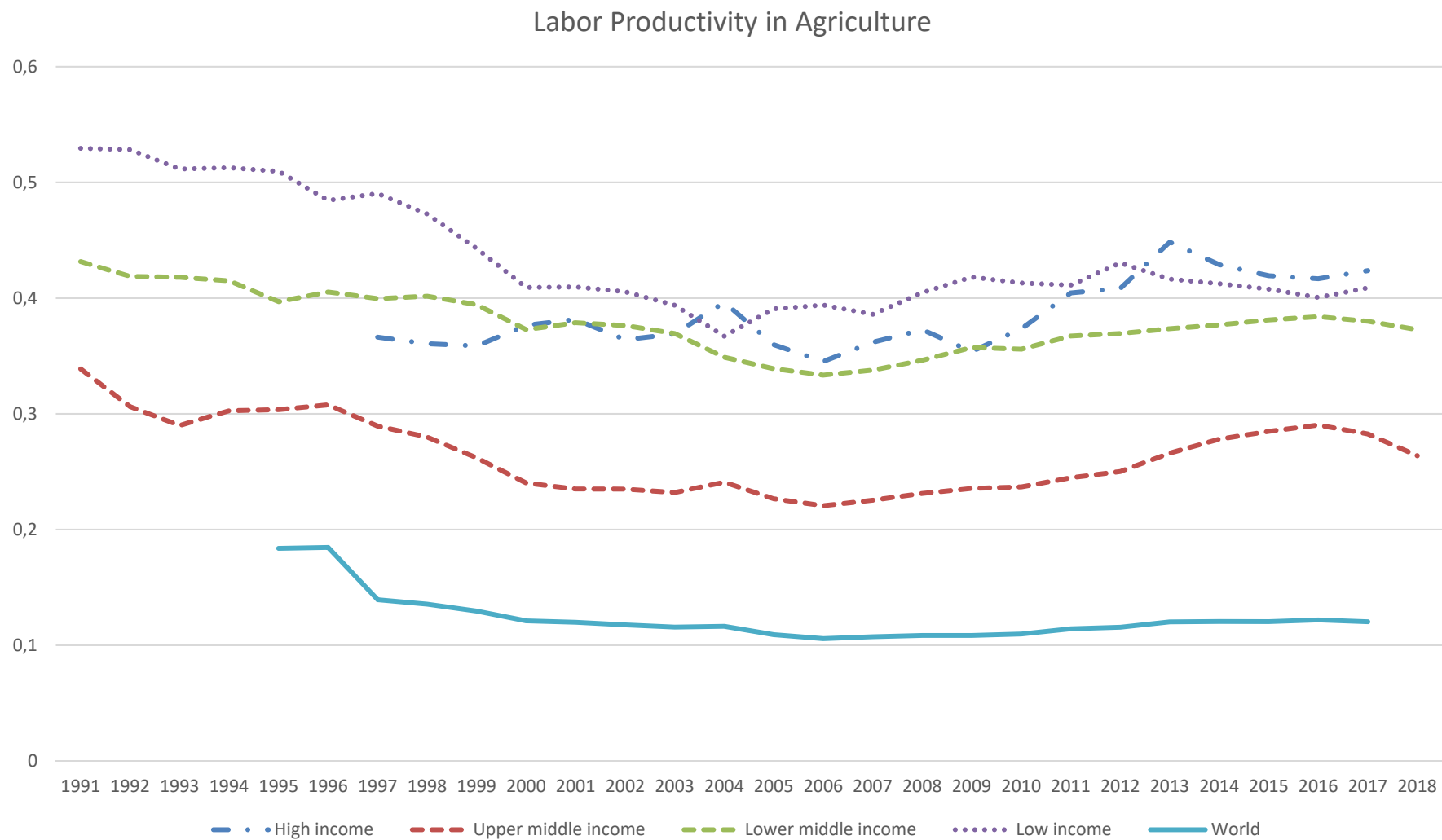
Share of Rural Population 1960-2018



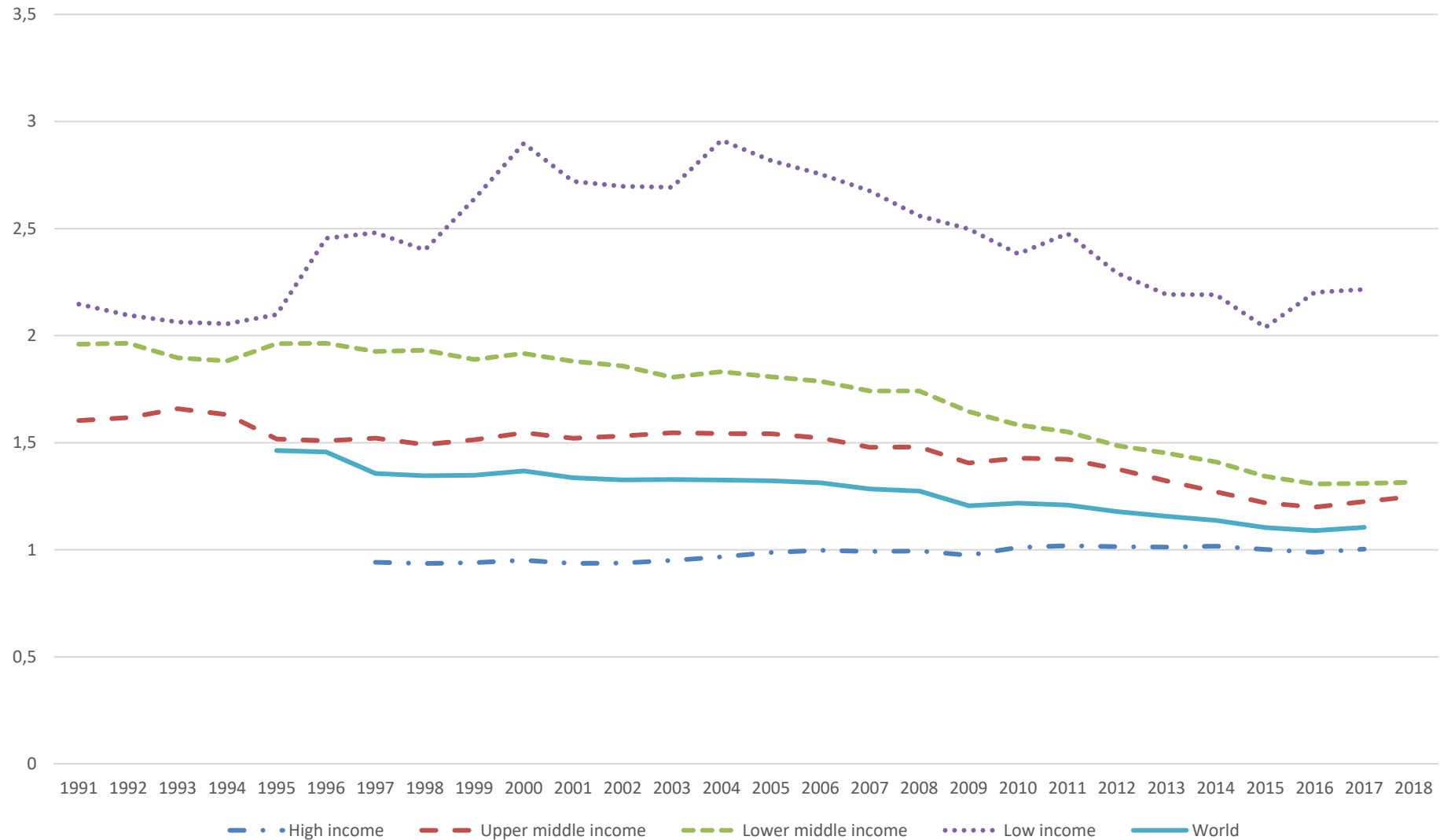
Rural Population 1960-2018



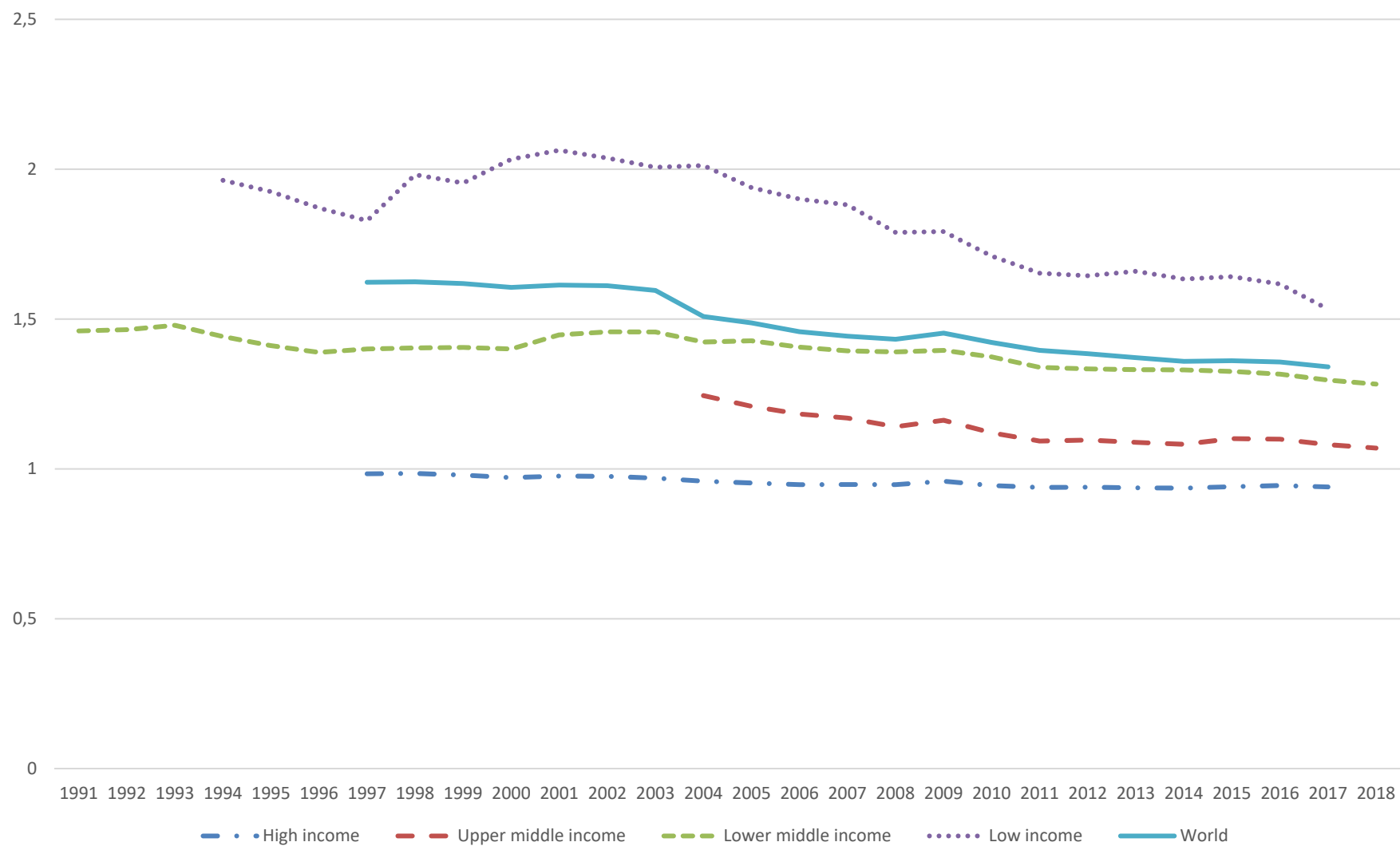
Labor Productivity in Agriculture



Labor Productivity in Industry 1991-2018



Labor Productivity in Service 1991-2018



Average Agriculture Income per Employed to Average National Income

