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Agricultural Restructuring in Vietnam over a Decade: Achievements and Unfinished Agenda for State Management

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Abstract
In 2013 Vietnam launched a national programme to restructure its agriculture towards higher value added and sustainable development. The programme was renewed in 2017 and 2021 and folded into a long-term strategy for 2021–2030. This article assesses what the first decade of restructuring achieved and what it left undone, with a focus on the role of the state. It relies on official statistics and policy documents for 2015–2024 and uses a target-versus-outcome assessment, trend analysis and a review of subsector evidence, without econometric modelling. The results show real but uneven progress. Agro-forestry-fishery exports doubled from USD 30.1 billion in 2015 to about USD 62.4 billion in 2024, and the sector's trade surplus reached around USD 18 billion. Fruit and vegetable exports almost quadrupled, and rice exports set new records in value with a clear shift towards higher-quality grades. The share of agriculture in total employment fell from 44.0% to 26.5%, and the share of communes meeting new rural development standards rose from about a quarter to more than three quarters. However, sector growth fell short of the restructuring target in 2016–2020, labour productivity in agriculture remained around 40% of the economy-wide average, and the gap between the sector's share of jobs and its share of output stayed wide. Farms remain small and fragmented, exports depend heavily on a few products and markets, forest cover targets were missed, the fisheries "yellow card" remained in place, and incentive schemes for agribusiness investment were weakly implemented. The article argues that the first decade succeeded mainly in areas where the state could act through planning, infrastructure and campaigns, and was weakest where progress depended on markets for land, services and quality. It proposes an agenda for state management centred on land markets, public goods, quality governance, market diversification and a shift from output targets to outcome measures.

Keywords: Agricultural Restructuring, Agricultural Transformation, State Management, Value Added, Rural Development, Vietnam

JEL Classification: O13; Q18; Q17; H83

1. Introduction

Agriculture was the starting point of Vietnam's economic success. The return of land to household farming in the late 1980s, followed by the liberalisation of prices and trade, turned a food-importing country into one of the world's largest exporters of rice, coffee, cashew nuts, pepper and seafood within little more than a decade (Pingali & Xuan, 1992; Ravallion & van de Walle, 2008) [26, 33]. By the early 2010s, however, the growth model that had served the sector so well was showing its limits. Output was rising mainly through more intensive use of land, water, fertiliser and labour. Farms were small and fragmented. Most exports left the country as raw commodities, often at prices below those of competitors, and environmental pressures were mounting (World Bank, 2016; OECD, 2015) [41, 22].

The government responded in June 2013 with Decision 899/QD-TTg, which approved a project to restructure agriculture "towards higher value added and sustainable development". The project set targets for growth, income, new rural development, forest cover and land use, and called for a shift from quantity to quality across crops, livestock, forestry and fisheries. It was followed by a restructuring plan for 2017–2020 (Decision 1819/QD-TTg), a plan for 2021–2025 (Decision 255/QD-TTg), the Strategy for Sustainable Agriculture and Rural Development for 2021–2030 (Decision 150/QD-TTg) and, in 2022, Resolution 19-NQ/TW of the Party Central Committee on agriculture, farmers and rural areas. Around these core documents grew a dense

layer of supporting policies: Incentives for enterprises investing in agriculture, support for production linkages, the One Commune One Product programme, the national target programme on new rural development and, more recently, a programme to develop one million hectares of high-quality, low-emission rice in the Mekong Delta.

A decade is a reasonable period over which to ask what this effort achieved. The question matters for Vietnam, where agriculture still employs more than a quarter of the workforce and accounts for a large share of exports, and where the next phase of policy will be shaped by a new Land Law, a reorganised system of ministries and local government, and new commitments on climate and trade. It also matters more broadly. Many middle-income countries are trying to move from an agriculture built on low costs and high volumes to one built on quality, sustainability and value added, and most of them rely heavily on the state to lead that shift.

Existing studies have examined parts of this story. There is a substantial literature on land rights and farm structure in Vietnam (Markussen *et al*., 2011; Ravallion & van de Walle, 2008) [17, 33], on the movement of labour out of agriculture (Liu *et al*., 2020; Nguyen *et al*., 2015) [15, 21], on the environmental costs of rice intensification in the Mekong Delta (Tran *et al*., 2018) [39] and on adaptation to sea-level rise and salinity (Smajgl *et al*., 2015) [36]. International organisations have reviewed agricultural policy at intervals (OECD, 2015; World Bank, 2016; Jones, 2022) [22, 41, 13]. What is still missing is an assessment that follows the restructuring programme as a whole across its first decade, compares its stated targets with measured outcomes, and draws conclusions about the role of the state.

This article provides such an assessment. It addresses three questions. First, to what extent did the agricultural sector achieve the targets set in the main restructuring documents between 2015 and 2024? Second, where were the achievements concentrated, and where were they weakest? Third, what do these patterns imply for the way the state manages agriculture in the next phase?

The study uses only published official data and policy documents and relies on descriptive methods: Target-versus-outcome comparison, trend analysis and the review of subsector evidence. It does not estimate an econometric model. Restructuring is a bundle of many policies implemented at the same time, and its effects cannot be cleanly separated from those of macroeconomic growth, trade agreements, climate shocks and the COVID-19 pandemic with the data available. A careful descriptive assessment, explicit about what the data can and cannot show, is more useful for policy than a single estimated coefficient.

The article makes three contributions. It assembles a consistent picture of the sector's performance across ten years from scattered official releases, and compares it systematically with the targets set by four successive policy documents. It proposes a simple way of reading the results, by distinguishing between achievements that the state could produce directly through planning, investment and campaigns, and achievements that depended on well-functioning markets for land, services and quality. And it sets out an agenda for state management that follows from this distinction.

The rest of the article is organised as follows. Section 2 reviews the relevant literature and sets out the analytical framework. Section 3 describes the data and methods. Section 4 traces the policy architecture of restructuring. Section 5 presents the results. Section 6 discusses the unfinished agenda, Section 7 draws out implications for state management and Section 8 concludes.

2. Literature review and analytical framework

2.1 Agricultural transformation and the role of agriculture in development

Classic development theory treats agriculture as a sector that releases labour and capital to the rest of the economy while feeding a growing urban population (Lewis, 1954; Johnston & Mellor, 1961) [14, 12]. Timmer (1988) [38] described the agricultural transformation as a sequence of stages in which agriculture first grows rapidly, then contributes resources to industry, then becomes integrated with the rest of the economy through markets, and finally takes a smaller but more productive place in a modern economy. Throughout this process, agriculture's share of output falls faster than its share of employment, so that productivity per worker in agriculture lags behind other sectors for a long time.

This lag is one of the most robust facts in development economics. Gollin *et al*. (2014) [9] showed that value added per worker in agriculture is typically several times lower than in the rest of the economy, even after adjusting for hours worked and human capital. McMillan and Rodrik (2011) [18] argued that the movement of workers from low-productivity agriculture into higher-productivity activities is a major source of growth in successful developing economies. In Vietnam, Liu *et al*. (2020) [15] found that rapid structural transformation reduced the number of people in farming, but that many households combined farm and non-farm work, which slowed consolidation of farmland.

The literature therefore suggests two different measures of success for agricultural restructuring. One is the speed with which labour leaves the sector, which depends mostly on growth elsewhere in the economy. The other is the rise in productivity and value added among those who remain, which depends on farm structure, technology, markets and the policy environment within agriculture. A restructuring programme should be judged mainly on the second.

2.2 From production to value chains

Since the 2000s, research on agriculture in developing countries has moved its focus from the farm to the food system. Reardon and Timmer (2012) [35] described a "food system revolution" in which supermarkets, processors and logistics firms reshape what farmers produce and how. Reardon *et al*. (2009) [34] showed that this transformation can raise farmers' incomes when they are able to meet new standards, but can also exclude smallholders who cannot. Barrett *et al*. (2022) [2] reviewed the evidence on value chain revolutions and concluded that the gains depend heavily on public goods, including infrastructure, standards, research and market information, that private firms will not supply on their own.

Small farm size is a central concern in this literature. Lowder *et al*. (2016) [16] estimated that most of the world's farms are smaller than two hectares. Otsuka *et al*. (2016) [24] argued that in Asia, rising wages make very small farms increasingly uncompetitive, and that farm size must grow if agriculture is to remain viable, a process that requires functioning land rental and sales markets and access to mechanisation services (Pingali, 2007) [25]. Where land

markets are restricted, farmers may remain on small plots as part-time producers, with low investment and low productivity.

2.3 The state in agricultural transformation

The role of the state in this process is contested. One tradition emphasises the dangers of state intervention in agricultural markets, from price controls and export taxes to subsidised inputs, which have often reduced incentives and diverted resources to politically favoured groups (Anderson *et al*., 2013; Swinnen, 2018) [1, 37]. Another tradition stresses that the state is indispensable for public goods: Research and extension, irrigation, roads, food safety systems and the legal framework for land and contracts (Byerlee *et al*., 2009; World Bank, 2007) [3, 40]. Evidence from Asia suggests that public spending on research, infrastructure and rural education has far higher returns than spending on input subsidies (Fan *et al*., 2008) [5].

Vietnam's agricultural policy has combined both traditions. The state retains strong planning powers over land use, including rules that protect paddy land, and a long tradition of production targets and administrative campaigns. At the same time, it has opened agricultural trade, signed a series of free trade agreements and sought to attract private investment into agribusiness. The OECD (2015) [22] and the World Bank (2016) [41] both recommended that Vietnam reduce its reliance on direct intervention and invest more in public goods and in the institutions that allow markets for land, credit and quality to function.

2.4 Analytical Framework

Building on this literature, the article uses a simple framework that distinguishes three kinds of restructuring outcomes.

The first kind are *volume and structural outcomes*: The growth of sector value added, the movement of labour out of agriculture and the change in the sector's share of GDP. These are shaped by restructuring but also by the wider economy.

The second kind are *value outcomes*: Higher export earnings, a shift towards higher-value products, better prices, higher labour productivity and higher rural incomes. These are the central aim of restructuring as stated in Decision 899.

The third kind are *sustainability and institutional outcomes*: Forest cover, resilience to climate shocks, emissions, food safety, organised production and functioning markets for land and services. These depend most heavily on institutions and long-term investment.

The framework also distinguishes two channels through which the state acts. In the *direct channel*, the state produces results through its own planning, budgets and campaigns: Building rural roads and irrigation, setting standards for new rural communes, organising product certification programmes or negotiating market access. In the *enabling channel*, the state creates conditions in which farmers, cooperatives and firms make the decisions that produce results: Secure and tradable land rights, effective incentives for private investment, credible quality and traceability systems, and research and extension that firms and farmers want to use. The working expectation of the study is that restructuring outcomes have been strongest where the direct channel is sufficient and weakest where progress depends on the enabling channel.

3. Data and Methods

3.1 Data sources

The analysis uses official data and documents only. Macroeconomic and labour market indicators come from the annual socio-economic reports and labour force releases of the General Statistics Office (GSO), now the National Statistics Office. Export, trade balance and subsector data come from year-end releases of the Ministry of Agriculture and Rural Development (MARD), now merged into the Ministry of Agriculture and Environment, as reported by government media. Data on rural income and poverty come from the Viet Nam Household Living Standards Survey (VHLSS). New rural development data come from the Central Coordination Office of the national target programme. Policy targets come from the texts of Decisions 899/QD-TTg, 1819/QD-TTg, 255/QD-TTg, 150/QD-TTg and 1490/QD-TTg, and from Resolution 19-NQ/TW. International assessments come from the OECD and the World Bank. Appendix A lists the sources.

3.2 Period and comparability

The main period of analysis is 2015–2024. The year 2015 is the first full year after the launch of restructuring for which consistent indicators are available, and 2024 is the last full year before the reorganisation of ministries and provinces in 2025. Where 2025 estimates are available, they are mentioned for context.

Three comparability issues require attention. The GSO revised its GDP series in 2019. Shares of GDP for 2015–2018 come from the earlier series and are not strictly comparable with those for 2019 onwards. The economy-wide labour productivity series was also rebased in 2021, so the level for 2021 cannot be compared directly with that for 2020. Finally, export and trade balance figures are year-end estimates, and final customs data can differ slightly. Where sources disagree, the article reports the range or the most widely used figure and notes the discrepancy.

3.3 Methods

The study combines three descriptive methods. The first is a *target-versus-outcome assessment*. Quantitative targets from the four main restructuring documents were extracted and compared with outcomes at the end of each plan period, or at the latest available date for plans still running. Each target is classified as achieved, partly achieved or not achieved. The second is *trend analysis* of the main indicators, including simple growth rates and ratios computed from published figures. The third is a *review of subsector evidence* for rice, fruit and vegetables, forestry and wood products, and fisheries, chosen because they account for most of the sector's export earnings and policy attention.

No regression or other inferential model is estimated. The results therefore describe what happened during the restructuring decade and how it compares with stated aims. They do not establish that particular policies caused particular outcomes, and the discussion is framed accordingly.

4. The policy architecture of restructuring

4.1 From a project to a strategy

Table 1 summarises the main documents of the restructuring decade. Decision 899/QD-TTg of 10 June 2013 set out the overall direction. It targeted growth in agricultural GDP of 2.6–3.0% a year in 2011–2015 and 3.5–4.0% a year in

2016–2020, rural income in 2020 at 2.5 times the 2008 level, 20% of communes meeting new rural standards by 2015 and 50% by 2020, forest cover of 42–43% by 2015 and 45% by 2020, and the protection of 3.8 million hectares of paddy land with rice output of 45 million tonnes by 2020.

Decision 1819/QD-TTg of 16 November 2017 translated the project into a plan for 2017–2020 with more modest growth ambitions: About 3% a year for sector GDP, at least 3.5% a year for labour productivity, agricultural labour below 40% of total employment, rural income at least 1.8 times the 2015 level, half of all communes meeting new rural standards, 15,000 effective cooperatives and forest cover of 42%.

Decision 255/QD-TTg of 25 February 2021 set the plan for 2021–2025. Its targets shifted from volume to value and organisation: Value-added growth of 2.5–3.0% a year, labour productivity growth of 7–8% a year, export growth of about 5% a year, growth of processing value added above 8% a year, more than 30% of output from cooperative or linked production, more than 25% under good agricultural practice standards, more than 20% from high-technology production, organic farming on 1.5–2% of agricultural land, agricultural labour at about 25% of total employment, and rural income at least 1.5 times the 2020 level.

The Strategy for Sustainable Agriculture and Rural Development for 2021–2030 (Decision 150/QD-TTg) and Resolution 19-NQ/TW of 16 June 2022 then placed restructuring within a longer horizon. The strategy targets agricultural GDP growth of 2.5–3.0% a year, labour productivity growth of 5.5–6.0% a year, export growth of 5–6% a year, rural income in 2030 at 2.5–3 times the 2020 level, agricultural labour below 20% of total employment, at least 90% of communes meeting new rural standards and a 10% reduction in greenhouse gas emissions from the sector compared with 2020.

Table 1: Main policy documents of agricultural restructuring, 2013-2023

Document	Date	Scope	Selected quantitative targets
Decision 899/QD-TTg	10 June 2013	Restructuring project to 2020	Sector GDP growth 3.5–4.0% a year (2016–2020); new rural communes 50% by 2020; forest cover 45% by 2020; 3.8 million ha of paddy land
Decision 1819/QD-TTg	16 Nov 2017	Plan 2017–2020	Growth about 3% a year; labour productivity growth at least 3.5% a year; agricultural labour below 40%; 15,000 effective cooperatives; forest cover 42%
Decision 255/QD-TTg	25 Feb 2021	Plan 2021–2025	Growth 2.5–3.0% a year; labour productivity growth 7–8% a year; exports growth about 5% a year; agricultural labour about 25%; rural income 1.5 times 2020
Decision 150/QD-TTg	2022	Strategy 2021–2030, vision 2050	Growth 2.5–3.0% a year; agricultural labour below 20%; rural income 2.5–3 times 2020; 90% of communes meeting new rural standards; emissions 10% below 2020
Resolution 19-NQ/TW	16 June 2022	Party resolution to 2030	Growth about 3% a year; labour productivity growth 5.5–6% a year; rural income 2.5–3 times 2020
Decision 1490/QD-TTg	27 Nov 2023	One million ha of high-quality, low-emission rice	Seed below 70 kg/ha; chemical inputs down 30%; emissions more than 10% below conventional practice; value added in rice chain up 40%

Source: Compiled from the texts of the decisions and resolution (see Appendix A)

4.2 Supporting instruments

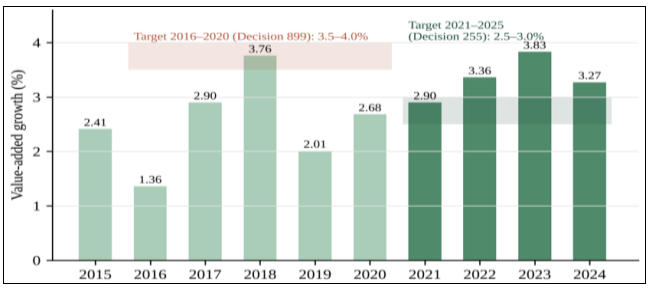
Several supporting instruments were added during the decade. Decree 57/2018/ND-CP provided incentives for enterprises investing in agriculture and rural areas, including land rent exemptions and direct support for investment in production and processing facilities. Decree 98/2018/ND-CP encouraged contracts and other linkages between farmers, cooperatives and firms. The One Commune One Product (OCOP) programme, approved by Decision 490/QD-TTg in 2018 and renewed by Decision 919/QD-TTg in 2022, aimed to develop and certify distinctive local products. The national target programme on new rural development, renewed for 2021–2025 by Decision 263/QD-TTg, set targets of at least 80% of communes meeting new rural standards, 40% of them at the advanced level and 10% at the model level. Finally, the Land Law of 2024, effective from 1 August 2024, relaxed several constraints on agricultural land, raising the limit on the transfer of agricultural land to an individual to 15 times the allocation limit and allowing people who do not farm directly to acquire paddy land under certain conditions.

Two features of this architecture deserve attention. Most instruments rely on the direct channel of state action: Targets, plans, certification programmes and administrative campaigns. Instruments that work through the enabling channel, notably Decree 57 and the land reforms, came later and, as Section 5 shows, have been harder to implement. The targets also moved over time, becoming less ambitious for volume growth and more focused on value, organisation and sustainability. This change reflects learning, but it also makes the restructuring decade harder to evaluate against a single benchmark.

5. Results

5.1 Growth: Below target in the first plan, above it in the second

Fig 1 shows the growth of value added in agriculture, forestry and fisheries between 2015 and 2024. In the five years 2016–2020, growth averaged 2.54% a year. This was well below the 3.5–4.0% set by Decision 899 and also below the roughly 3% set by Decision 1819 for 2017–2020. Growth fell to 1.36% in 2016, the year of severe drought and saltwater intrusion in the Mekong Delta and the Central Highlands, and to 2.01% in 2019, when African swine fever devastated the pig herd. Only 2018, at 3.76%, came close to the original target.



Source: Authors' compilation from GSO annual socio-economic reports and Decisions 899/QD-TTg and 255/QD-TTg.

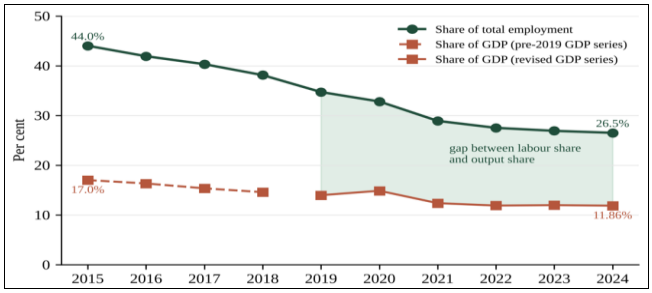
Fig 1: Growth of value added in agriculture, forestry and fisheries, 2015–2024, against restructuring targets

Growth improved in the second plan period. Between 2021 and 2024, value added grew by 3.34% a year on average, above the 2.5–3.0% target of Decision 255, despite the COVID-19 pandemic. In 2023 the sector grew by 3.83%, its fastest rate in a decade. Preliminary data show growth of 3.78% in 2025. The improvement was broad: In 2022–2024, forestry grew by 3.7–6.1% a year and fisheries by 3.7–4.4%, while crop and livestock agriculture grew by 2.9–3.9%.

Two observations temper this result. The lower target for 2021–2025 was easier to meet than the higher target for 2016–2020, so part of the improvement in the scorecard reflects a change of benchmark. And agriculture played a stabilising role during the pandemic: In 2020 and 2021, when GDP grew by only 2.91% and 2.58%, the sector grew by 2.68% and 2.90%, close to or above the economy as a whole. Its resilience in those years is one of the clearest achievements of the decade, but it says more about the sector's role as a buffer than about structural change.

5.2 Structural change: Rapid labour shift, persistent productivity gap

Fig 2 compares the share of agriculture, forestry and fisheries in total employment with its share of GDP. The labour share fell from 44.0% in 2015 to 26.5% in 2024, a decline of 17.5 percentage points in nine years. About 20.7 million people worked in the sector in 2018, and 13.7 million in 2024. The target of Decision 1819 (agricultural labour below 40% by 2020) was met early, at 32.8% in 2020, and the target of Decision 255 (about 25% by 2025) is within reach.



Source: GSO labour force surveys and annual socio-economic reports. GDP shares for 2015–2018 come from the series before the 2019 revision

Fig 2: Share of agriculture, forestry and fisheries in employment and GDP, 2015–2024

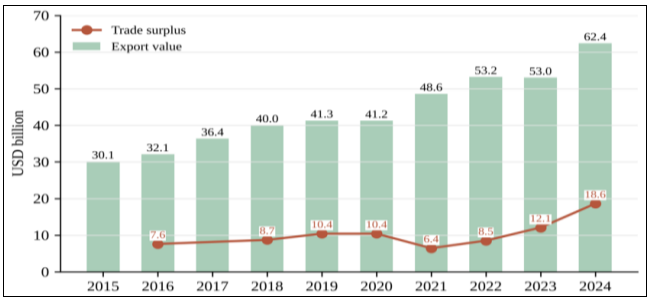
The sector's share of GDP fell more slowly in recent years. On the revised series, it was 13.96% in 2019, rose briefly to 14.85% in 2020 as other sectors contracted, and then fell to 12.36% in 2021 and 11.86% in 2024. In 2024, therefore, agriculture employed 26.5% of workers but produced 11.86% of GDP. Output per worker in the sector was roughly 45% of the economy-wide average, if one simply divides the two shares.

Direct estimates of labour productivity tell a similar story. In 2016, value added per worker in agriculture, forestry and fisheries was VND 32.9 million at current prices, about 39% of the economy-wide figure of VND 84.5 million. In 2019, it was VND 44.7 million, about 40% of the national VND 110.4 million. Productivity in the sector grew by 7.92% a year on average between 2016 and 2019, faster than the 3.5% target set by Decision 1819 and faster than in other sectors. Yet the ratio to the national average barely changed, because productivity rose quickly elsewhere too.

This pattern matches the international literature (Gollin *et al*., 2014) [9]. It suggests that most of the narrowing of the gap so far has come from people leaving agriculture rather than from a transformation of how those who remain farm. The 2021–2025 target of labour productivity growth of 7–8% a year is ambitious, and the lack of a consistent published series for sector productivity since 2020 makes it difficult to monitor.

5.3 Exports and value: The strongest achievement

Exports are where restructuring delivered most clearly. As Fig 3 shows, agro-forestry-fishery exports rose from USD 30.13 billion in 2015 to about USD 62.4 billion in 2024, more than doubling in nine years. This corresponds to average growth of about 8.4% a year, well above the 5% a year targeted for 2021–2025. Preliminary figures show exports of more than USD 70 billion in 2025.

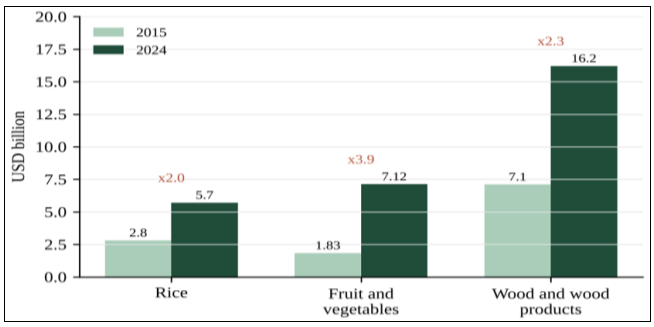


Source: MARD year-end estimates reported by government media. The trade surplus for 2015 and 2017 was not found in verifiable form

Fig 3: Agro-forestry-fishery exports and trade surplus, 2015–2024

The sector's trade surplus also grew. It was USD 7.6 billion in 2016 and about USD 10.4 billion in 2019 and 2020, dipped to USD 6.44 billion in 2021 as input imports rose, and then climbed to USD 12.07 billion in 2023 and around USD 18 billion in 2024. One official estimate puts the 2024 surplus at USD 17.9 billion, or 71.6% of the national trade surplus, which highlights how important agriculture remains to Vietnam's external balance.

The composition of exports changed in ways that reflect the restructuring objectives (Fig 4). Fruit and vegetable exports rose from USD 1.83 billion in 2015 to USD 7.12 billion in 2024, almost four times as much. Exports of wood and wood products rose from USD 7.1 billion to about USD 16.2 billion, and total forest product exports reached USD 17.28 billion. Rice export earnings doubled from about USD 2.8 billion to USD 5.7 billion. Coffee exports reached about USD 5.5 billion in 2024 and seafood about USD 10 billion.



Source: MARD year-end estimates and trade association data reported by government media

Fig 4: Export value of selected product groups, 2015 and 2024

The rice sector illustrates the shift from volume to value particularly well. Rice output was 45.2 million tonnes in 2015 and 43.46 million tonnes in 2024, slightly lower, as planted area fell from about 7.8 million to 7.13 million hectares while yields rose from 5.77 to 6.09 tonnes per hectare. Yet export volume increased from about 6.6 million tonnes to about 9 million tonnes, and export value from about USD 2.8 billion to USD 5.7 billion. The average export price rose from about USD 426 per tonne in 2015 to more than USD 600 per tonne in 2024. Part of this rise reflects high world prices after India restricted its exports in 2023, but part reflects a durable shift towards fragrant and high-quality varieties. Releasing paddy land for other uses while raising export earnings is close to what the restructuring programme intended.

Table 2 summarises the main indicators across the decade.

Table 2: Main indicators of agriculture, forestry and fisheries, 2015-2024

Year	GDP growth (%)	Sector growth (%)	Sector share of GDP (%)	Share of employment (%)	Exports (USD bn)	Trade surplus (USD bn)
2015	6.68	2.41	17.00	44.0	30.13	
2016	6.21	1.36	16.32	41.9	32.10	7.60
2017	6.81	2.90	15.34	40.3	36.37	
2018	7.08	3.76	14.57	38.1	40.02	about 8.7
2019	7.02	2.01	13.96	34.7	41.30	10.40
2020	2.91	2.68	14.85	32.8	41.25	10.40
2021	2.58	2.90	12.36	28.9	48.60	6.44
2022	8.02	3.36	11.88	27.5	53.22	8.50
2023	5.05	3.83	11.96	about 26.9	53.01	12.07
2024	7.09	3.27	11.86	26.5	62.40	17.9–18.6

Source: GSO annual socio-economic reports and labour force surveys; MARD year-end estimates (see Appendix A). Shares of GDP for 2015–2018 come from the series before the 2019 revision. Blank cells: Not found in verifiable form

5.4 Rural incomes and new rural development

Rural living standards improved substantially. According to the VHLSS, average monthly income per person in rural areas rose from VND 2.42 million in 2016 to VND 3.48 million in 2020, VND 3.86 million in 2022 and VND 4.5 million in 2024 (Table 3). The ratio of urban to rural income fell from 1.88 in 2016 and 2018 to 1.59 in 2020 and about 1.5 in 2024. Rural poverty, measured by the multidimensional standard of the time, fell from 11.8% in 2016 to 7.1% in 2020.

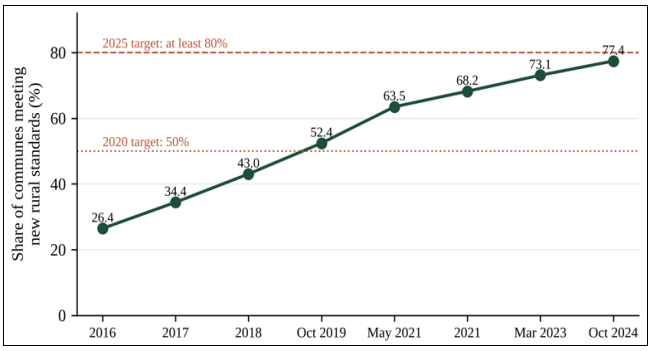
Table 3: Income and poverty in rural and urban areas, 2016-2024

Year	Monthly income per person, urban (VND thousand)	Monthly income per person, rural (VND thousand)	Urban to rural ratio	Poverty rate, rural (%)
2016	4,551	2,423	1.88	11.8
2018	5,624	2,986	1.88	9.6
2020	5,538	3,480	1.59	7.1
2022	about 5,950	3,860	1.54	
2024	6,900	4,500	about 1.5	

Source: GSO, Household Living Standards Survey. Poverty rates for 2022 and 2024 use a revised standard and were not published separately for rural areas in the sources consulted

Measured against targets, the picture is mixed. Rural income in 2024 was about 1.29 times its 2020 level in nominal terms. With one year remaining, this leaves a considerable distance to the target of 1.5 times set by Decision 255 for 2025. The narrowing of the urban–rural gap is real, but rural income includes wages from non-farm work, so it cannot be read simply as a gain in farm income.

New rural development is the clearest example of success through the direct channel (Fig 5). The share of communes meeting the national standards rose from 26.43% at the end of 2016 to 52.4% in October 2019, passing the 2020 target of 50% a year early. It reached 68.2% at the end of 2021 and 77.4% in October 2024, and official reports put it at about 78% by the end of 2024, close to the 2025 target of 80%. By October 2024, 2,182 communes had met the advanced standard and 480 the model standard, and 305 of 645 districts had been recognised as meeting the standard by the end of the year.



Source: Central Coordination Office of the national target programme on new rural development, as reported by government media

Fig 5: Share of communes meeting new rural development standards, 2016-2024

The programme transformed rural infrastructure, especially roads, schools, clinics, electricity and clean water. Its criteria, however, focus heavily on physical facilities and administrative completion, and the pressure to reach recognition quickly has in some localities left debts for infrastructure works. The programme's next phase will need to give more weight to income, environment and the quality of services.

5.5 Organisation of production

The restructuring documents placed great emphasis on organising farmers into cooperatives and linking them with firms. The number of agricultural cooperatives rose from 18,327 in October 2021 to 22,415 at the end of 2024, about two thirds of all cooperatives in the country, well above the target of 15,000 effective cooperatives set for 2020. The 2020 mid-term rural and agricultural survey also recorded 7,471 agricultural enterprises, up 94% from 2016.

Numbers alone, however, say little about how well cooperatives function. Many were converted from older collective structures or formed to access support, and their scale and services remain limited. Linkage targets are also hard to monitor: Decision 255 aimed for more than 30% of output to come from cooperative or linked production by 2025, but no consistent national series on this share has been published.

The OCOP programme grew very quickly. The number of products rated three stars or more rose from 4,469 in March 2021 to more than 10,800 by December 2023 and about 15,590 by December 2024, well above the target of at least 10,000 products by 2025. The programme has helped local producers to improve packaging, branding and food safety,

but the ministry itself has warned against chasing numbers, and the commercial performance of many certified products remains unclear.

5.6 Sustainability and resilience

Results on sustainability are the weakest part of the record. Decision 899 targeted forest cover of 45% by 2020. Forest cover stood at 42.02% in 2022 and 2023 and at about 42.03% in 2025, meeting the lower target of 42% set by Decision 1819 but falling well short of the original goal. The fact that the later target was lowered to match the achievable level illustrates the movement of benchmarks noted in Section 4.

Resilience to climate shocks improved. In the 2015–2016 dry season, saltwater intrusion in the Mekong Delta damaged about 405,000 hectares of rice and affected about 210,000 households. The 2019–2020 intrusion was the most severe on record, yet only about 58,400 hectares of rice were damaged, around 14% of the earlier figure, and about 96,000 households were affected. Better forecasting, earlier planting calendars, sluice operations and changes in land use all contributed. This is a significant achievement of state management in the direct channel.

Emissions are a new and growing concern. Agriculture accounts for about 30% of Vietnam's greenhouse gas emissions, and rice cultivation for about half of the sector's total. The programme for one million hectares of high-quality, low-emission rice approved in 2023 marks a shift in approach, linking emission reduction to quality, value added and farmer profit. Its first phase builds on 180,000 hectares under a World Bank-supported sustainable agriculture project and is too recent to evaluate.

Market access has been affected by sustainability concerns in fisheries. In October 2017, the European Commission issued Vietnam a "yellow card" warning for insufficient action against illegal, unreported and unregulated (IUU) fishing. Despite repeated inspections in 2018, 2019, 2022 and 2023, the warning had not been lifted by the end of the study period. The share of the European Union in Vietnam's seafood exports fell to around 12% in 2022 (Nguyen, 2024) [20], and every consignment is now subject to inspection, extending clearance times from days to weeks.

5.7 Target-versus-outcome assessment

Table 4 brings together the main quantitative targets and the corresponding outcomes.

Table 4: Selected restructuring targets and outcomes

Target	Source document	Target value	Outcome	Assessment
Sector value-added growth, 2016–2020	Decision 899	3.5–4.0% a year	2.54% a year	Not achieved
Sector value-added growth, 2017–2020	Decision 1819	about 3% a year	2.84% a year	Partly achieved
Sector value-added growth, 2021–2025	Decision 255	2.5–3.0% a year	3.34% a year (2021–2024)	Achieved
Labour productivity growth	Decision 1819	at least 3.5% a year	7.92% a year (2016–2019)	Achieved
Agricultural share of employment, 2020	Decision 1819	below 40%	32.8%	Achieved
Agricultural share of employment, 2025	Decision 255	about 25%	26.5% (2024)	On track
Export growth, 2021–2025	Decision 255	about 5% a year	about 10.9% a year (2021–2024)	Achieved
Communes meeting new rural standards, 2020	Decisions 899 and 1819	50%	52.4% (Oct 2019)	Achieved
Communes meeting new rural standards, 2025	Decision 263	at least 80%	about 78% (end 2024)	On track
Effective cooperatives, 2020	Decision 1819	15,000	18,327 agricultural cooperatives (2021)	Achieved in number
Rural income, 2025	Decision 255	1.5 times 2020	1.29 times (2024)	At risk
Forest cover, 2020	Decision 899	45%	about 42%	Not achieved
Forest cover, 2020	Decision 1819	42%	about 42%	Achieved
Rice output, 2020	Decision 899	45 million tonnes	below 45 million tonnes (43.46 million in 2024)	Not achieved, as land shifted to other uses

Source: Authors' assessment based on Tables 1 to 3 and Appendix A sources. Export growth for 2021–2024 is the compound annual rate from USD 41.25 billion in 2020 to USD 62.4 billion in 2024

The scorecard confirms the expectation set out in Section 2.4. Targets that the state could pursue directly, through infrastructure, campaigns and certification, were met or exceeded: new rural communes, numbers of cooperatives and OCOP products, and resilience to saline intrusion. Targets driven by external demand and private investment, such as exports, were also exceeded, helped by free trade agreements and strong prices. Targets that depended on deeper changes in farm structure, institutions and environmental management were missed or are at risk: growth in the first plan period, rural farm income, and forest cover. Labour productivity in agriculture rose quickly but did not close the gap with the rest of the economy.

6. The unfinished agenda

The achievements of the decade are substantial. But the evidence also points to six areas in which restructuring remains incomplete. Table 5 summarises them.

Table 5: The unfinished agenda of agricultural restructuring

Area	Evidence	Main constraint
Farm structure and land	Small, fragmented holdings; productivity per worker about 40% of the national average	Restrictive land markets until 2024; rice land protection rules
Value added and processing	Raw and semi-processed products dominate exports	Weak incentives for agribusiness investment; limited processing capacity
Market concentration	China takes more than 60% of fruit and vegetable exports; durian about half of the group's value	Narrow product and market base; sanitary and traceability gaps
Quality and traceability	IUU yellow card since 2017; repeated food safety concerns	Fragmented inspection systems; weak enforcement at local level
Environment and climate	Forest cover target missed; agriculture about 30% of national emissions	Late shift to low-emission practices; limited payment for environmental services
Public support and institutions	Producer support negative in 2016–2018; general services about 2.5% of agricultural value added	Low spending on research and extension; weak implementation of investment incentives

Source: Authors' synthesis of the evidence in Section 5 and OECD (2019) [23] and Jones (2022) [13]

6.1 Farm structure and land

Vietnam's agriculture is still built on very small holdings. Official estimates from the late 2000s put the number of plots at around 70 million, with an average plot of about 0.14 hectares, and although some consolidation has taken place since then, small and fragmented farms remain the norm in most regions. The OECD notes that land-use rules favouring rice have preserved a structure of small, part-time household farms (Jones, 2022) [13]. Until 2024, limits on land accumulation and restrictions on who could acquire paddy land discouraged consolidation, and many households that had moved into non-farm work kept their land as security rather than renting it out.

The Land Law of 2024 removes some of these barriers by raising the limit on land transfers and allowing non-farmers to acquire paddy land under conditions. Its effects will depend on how provinces apply the new rules, on the development of land rental markets and on the availability of mechanisation services, which allow larger farms to operate without hiring large amounts of labour (Otsuka *et al*., 2016; Pingali, 2007) [24, 25]. In the language of the analytical framework, farm structure is a typical problem of the enabling channel: the state cannot consolidate farms by decree, but it can make it easier and safer for households to rent, sell or pool land.

6.2 Value added and the investment gap

Despite the growth of exports, most products still leave Vietnam with limited processing. The World Bank (2016) [41] observed that Vietnamese exports were mostly raw, often sold at lower prices than competitors' products, and that much of the value was captured by foreign firms. Restructuring aimed to change this through incentives for private investment, but these incentives have worked poorly. Decree 57/2018 promised direct support for enterprises investing in agriculture, yet a member of the National Assembly has reported that most eligible enterprises had not received the promised support, and a replacement decree has been under preparation. The sector's share of foreign direct investment also remains small: by the end of 2024, there were 729 valid foreign-invested projects in agriculture and environment with total registered capital of about USD 11.9 billion, a modest figure relative to Vietnam's total FDI stock.

The gap between policy promises and actual support has a cost beyond lost investment. It weakens the credibility of the state as a partner of agribusiness, which is precisely the relationship that value chain development requires (Barrett *et al*., 2022) [2].

6.3 Market concentration

The export boom of recent years rests on a narrow base. In 2024, China absorbed more than 60% of Vietnam's fruit and vegetable exports, and a single product, durian, accounted for close to half of the group's export value, at about USD 3.3 billion. In rice, the Philippines took around 40% of export volume. This concentration creates risk. Changes in sanitary rules, border procedures or demand in a single market can cause large losses for farmers who have shifted their land to the corresponding crops. Diversifying markets requires investment in sanitary and phytosanitary capacity, plant protection, laboratory testing and traceability, all of which are public goods that the state must supply or regulate.

6.4 Quality, traceability and compliance

The IUU yellow card shows how quality and compliance failures can impose costs on an entire subsector. Lifting the card requires changes that are institutional rather than technical: vessel monitoring, catch documentation, enforcement against violators and cooperation between central and local authorities. Similar issues arise in food safety and in the use of pesticides and veterinary drugs. Restructuring set targets for the share of output under good agricultural practice standards and for organic farming, but consistent national data on these indicators are not published, which makes it difficult to judge progress.

6.5 Environment and climate

The failure to reach the original forest cover target, the importance of agriculture in national emissions and the vulnerability of the Mekong Delta to salinity and land subsidence all point to the environmental dimension as the least developed part of restructuring. The intensification of rice cultivation, especially the move to three crops a year behind high dykes in parts of the Mekong Delta, increased output in the short term but reduced sediment deposition and raised input use, with doubtful long-term economics (Tran *et al*., 2018) [39]. Adaptation to rising sea levels requires planning across provinces and over several decades (Smajgl *et al*., 2015) [36]. The one million hectare rice programme, the 2030 emission target and the shift towards mixed rice-shrimp and fruit systems in saline areas are steps in the right direction, but they remain at an early stage.

6.6 Public support and institutions

Finally, the pattern of public support to agriculture has not yet adjusted to the aims of restructuring. The OECD estimated that Vietnam's producer support estimate was

negative, at about minus 5.9% of gross farm receipts in 2016–2018, because rice producers were implicitly taxed when domestic prices were below world prices, while some products were protected by tariffs (OECD, 2019) [23]. Spending on general services such as research, extension, inspection and infrastructure amounted to only about 2.5% of agricultural value added in 2018–2020, well below the OECD average (Jones, 2022) [13]. Agricultural and rural credit is large, at about a quarter of total outstanding credit in 2022, but published data do not show how much of it finances long-term investment in farming and processing rather than rural consumption and non-farm activities. International experience suggests that public spending on research, extension and infrastructure has the highest returns for agricultural growth and poverty reduction (Fan *et al*., 2008) [5].

7. Implications for state management

The evidence of the restructuring decade points to a shift in how the state manages agriculture. The direct channel of state action, through planning, infrastructure and campaigns, has delivered much of what it can. The next gains depend on the enabling channel. Five implications follow.

The first concerns *targets and monitoring*: The restructuring documents relied heavily on output targets, many of which changed between plans. A more effective approach would focus on a small set of outcome indicators that are measured consistently over time and published regularly: Value added per worker in agriculture, farm income, the share of output under certified quality standards, the share of output produced under contracts, and emissions per unit of output. Several of these indicators are already targeted in Decision 255 but are not reported in a consistent national series. Without them, the state cannot learn what works.

The second concerns *land*: The Land Law of 2024 provides an opportunity to accelerate consolidation. The state can support this by simplifying land rental procedures, providing standard contracts, recording land transactions transparently, supporting land pooling through cooperatives and protecting the rights of households that rent out their land. Rules on paddy land protection should be reviewed so that they protect food security goals without locking farmers into low-value rice production where other crops or aquaculture would earn more.

The third concerns *investment incentives*: Incentives such as those in Decree 57 will only change investment decisions if they are credible. A replacement scheme should be simpler, better funded and administered through predictable procedures, with clear criteria and published disbursement data. The state could also shift some resources from direct support for individual firms to shared infrastructure, such as cold storage, logistics hubs and testing laboratories in production regions, which benefit many firms and farmers at once.

The fourth concerns *quality and markets*: Market diversification and the lifting of the IUU yellow card both depend on credible systems for traceability, inspection and enforcement. These systems are spread across several agencies and levels of government. The reorganisation of ministries and provinces in 2025 offers a chance to consolidate responsibilities, to give local authorities clear duties and resources for enforcement, and to link domestic standards with those of major importing markets.

The fifth concerns *public goods and the environment*: Public spending should move towards research and extension, plant and animal health, water management and climate adaptation, and away from subsidies or campaigns whose effects are hard to measure. Emission reduction programmes such as the one million hectare rice programme should be designed so that farmers capture part of the value of lower emissions, through price premiums, carbon payments or reduced input costs, and should be monitored with transparent data.

These implications are consistent with the recommendations of the OECD and World Bank (OECD, 2015; World Bank, 2016; Jones, 2022) [22, 41, 13]. The contribution of this article is to show, using a decade of evidence, why they matter: The targets that were missed or remain at risk are concentrated in precisely the areas these recommendations address.

7.1 Limitations

The study has several limitations. Its methods are descriptive, so it cannot attribute outcomes to particular policies. Agricultural performance in 2015–2024 was also shaped by world prices, trade agreements, the pandemic, African swine fever and climate events, which the analysis can note but not separate. Several important indicators, including sector labour productivity after 2020, the share of linked and certified production and the use of good agricultural practices, are not published in consistent national series, and some figures are year-end estimates that may later be revised. Breaks in the GDP and productivity series limit comparisons over the full decade. Finally, national averages hide large regional differences, especially between the Mekong Delta, the Central Highlands and the northern mountains, which deserve separate study.

8. Conclusion

A decade after Vietnam launched its agricultural restructuring programme, the sector looks very different from 2013. Exports have doubled, the trade surplus has grown, fruit and vegetables and wood products have become major export earners, rice exports earn far more per tonne, and the rural landscape has been transformed by new infrastructure. The sector also proved remarkably resilient during the pandemic. Fewer people work in agriculture, and those who remain earn more.

Yet the central aim of restructuring, to raise value added and productivity on a sustainable basis, has been only partly achieved. Growth fell short of target in the first plan period. Productivity per worker in agriculture remains about two fifths of the national average. Farms remain small, much of the produce is still exported with little processing, exports depend heavily on a few markets, and environmental targets have been missed or lowered.

The pattern of success and failure is not random. The state achieved most where it could act directly, through planning, investment and campaigns. It achieved least where progress depended on well-functioning markets for land, investment and quality, which the state can enable but not command. The next phase of restructuring should therefore focus less on new targets and programmes and more on the institutions that allow farmers, cooperatives and firms to make better decisions: Secure and tradable land rights, credible incentives, reliable quality systems, strong research and extension, and consistent public data. That shift, from

directing agriculture to enabling it, is the unfinished agenda of state management.

9. References

1. Anderson K, Rausser G, Swinnen J. Political economy of public policies: Insights from distortions to agricultural and food markets. Journal of Economic Literature. 2013; 51(2):423-477. Doi: https://doi.org/10.1257/jel.51.2.423
2. Barrett CB, Reardon T, Swinnen J, Zilberman D. Agri-food value chain revolutions in low- and middle-income countries. Journal of Economic Literature. 2022; 60(4):1316-1377. Doi: https://doi.org/10.1257/jel.20201539
3. Byerlee D, de Janvry A, Sadoulet E. Agriculture for development: Toward a new paradigm. Annual Review of Resource Economics. 2009; 1:15-31. Doi: https://doi.org/10.1146/annurev.resource.050708.144239
4. Communist Party of Viet Nam. Resolution No. 19-NQ/TW of 16 June 2022 of the 5th Plenum of the 13th Central Committee on agriculture, farmers and rural areas to 2030, with a vision to 2045. Hanoi, 2022.
5. Fan S, Gulati A, Thorat S. Investment, subsidies, and pro-poor growth in rural India. Agricultural Economics. 2008; 39(2):163-170. Doi: https://doi.org/10.1111/j.1574-0862.2008.00328.x
6. General Statistics Office (GSO). Report on the socio-economic situation in the fourth quarter and the whole year [Annual releases for 2015 to 2024]. Hanoi, 2016-2025.
7. General Statistics Office (GSO). Results of the Viet Nam Household Living Standards Survey 2020. Hanoi, 2021.
8. General Statistics Office (GSO). Results of the mid-term rural and agricultural survey 2020. Hanoi, 2022.
9. Gollin D, Lagakos D, Waugh ME. The agricultural productivity gap. Quarterly Journal of Economics. 2014; 129(2):939-993. Doi: https://doi.org/10.1093/qje/qjt056
10. Government of Viet Nam. Decree No. 57/2018/ND-CP of 17 April 2018 on mechanisms and policies to encourage enterprises to invest in agriculture and rural areas. Hanoi, 2018a.
11. Government of Viet Nam. Decree No. 98/2018/ND-CP of 5 July 2018 on policies to encourage cooperation and linkages in the production and consumption of agricultural products. Hanoi, 2018b.
12. Johnston BF, Mellor JW. The role of agriculture in economic development. American Economic Review. 1961; 51(4):566-593.
13. Jones D. Innovation, agricultural productivity and sustainability in Viet Nam (OECD Food, Agriculture and Fisheries Papers). OECD Publishing, 2022.
14. Lewis WA. Economic development with unlimited supplies of labour. The Manchester School. 1954; 22(2):139-191. Doi: https://doi.org/10.1111/j.1467-9957.1954.tb00021.x
15. Liu Y, Barrett CB, Pham T, Violette W. The intertemporal evolution of agriculture and labor over a rapid structural transformation: Lessons from Vietnam. Food Policy. 2020; 94:101913. Doi: https://doi.org/10.1016/j.foodpol.2020.101913
16. Lowder SK, Skoet J, Raney T. The number, size, and distribution of farms, smallholder farms, and family farms worldwide. World Development. 2016; 87:16-29. Doi: https://doi.org/10.1016/j.worlddev.2015.10.041
17. Markussen T, Tarp F, Van den Broeck K. The forgotten property rights: Evidence on land use rights in Vietnam. World Development. 2011; 39(5):839-850. Doi: https://doi.org/10.1016/j.worlddev.2009.07.016
18. McMillan MS, Rodrik D. Globalization, structural change and productivity growth (NBER Working Paper No. 17143). National Bureau of Economic Research, 2011.
19. National Assembly of Viet Nam. Land Law No. 31/2024/QH15. Hanoi, 2024.
20. Nguyen KG. Assessing Vietnam's challenges in fighting IUU fishing (ISEAS Perspective No. 2024/18). ISEAS–Yusof Ishak Institute, 2024.
21. Nguyen LD, Raabe K, Grote U. Rural–urban migration, household vulnerability, and welfare in Vietnam. World Development. 2015; 71:79-93. Doi: https://doi.org/10.1016/j.worlddev.2013.11.002
22. OECD. Agricultural policies in Viet Nam 2015. OECD Food and Agricultural Reviews. OECD Publishing, 2015.
23. OECD. Agricultural policy monitoring and evaluation 2019. OECD Publishing, 2019.
24. Otsuka K, Liu Y, Yamauchi F. The future of small farms in Asia. Development Policy Review. 2016; 34(3):441-461. Doi: https://doi.org/10.1111/dpr.12159
25. Pingali P. Agricultural mechanization: Adoption patterns and economic impact. In R. Evenson & P. Pingali (Eds.), Handbook of agricultural economics (Vol. 3, pp. 2779–2805). Elsevier, 2007.
26. Pingali PL, Xuan V-T. Vietnam: Decollectivization and rice productivity growth. Economic Development and Cultural Change. 1992; 40(4):697-718. Doi: https://doi.org/10.1086/451970
27. Prime Minister of Viet Nam. Decision No. 899/QD-TTg of 10 June 2013 approving the project on agricultural restructuring towards higher value added and sustainable development. Hanoi, 2013.
28. Prime Minister of Viet Nam. Decision No. 1819/QD-TTg of 16 November 2017 approving the plan for agricultural restructuring for 2017–2020. Hanoi, 2017.
29. Prime Minister of Viet Nam. Decision No. 255/QD-TTg of 25 February 2021 approving the plan for agricultural restructuring for 2021–2025. Hanoi, 2021.
30. Prime Minister of Viet Nam. Decision No. 150/QD-TTg approving the strategy for sustainable agriculture and rural development for 2021–2030, with a vision to 2050. Hanoi, 2022a.
31. Prime Minister of Viet Nam. Decision No. 263/QD-TTg approving the national target programme on new rural development for 2021–2025. Hanoi, 2022b.
32. Prime Minister of Viet Nam. Decision No. 1490/QD-TTg of 27 November 2023 approving the project on sustainable development of one million hectares of high-quality, low-emission rice associated with green growth in the Mekong Delta by 2030. Hanoi, 2023.
33. Ravallion M, van de Walle D. Land in transition: Reform and poverty in rural Vietnam. World Bank and Palgrave Macmillan, 2008.
34. Reardon T, Barrett CB, Berdegué JA, Swinnen JFM. Agrifood industry transformation and small farmers in developing countries. World Development. 2009;

37(11):1717-1727. Doi: https://doi.org/10.1016/j.worlddev.2008.08.023
35. Reardon T, Timmer CP. The economics of the food system revolution. Annual Review of Resource Economics. 2012; 4:225-264. Doi: https://doi.org/10.1146/annurev.resource.050708.144147
36. Smajgl A, Toan TQ, Nhan DK, Ward J, Trung NH, Tri LQ, *et al*. Responding to rising sea levels in the Mekong Delta. Nature Climate Change. 2015; 5(2):167-174. Doi: https://doi.org/10.1038/nclimate2469
37. Swinnen J. The political economy of agricultural and food policies. Palgrave Macmillan, 2018.
38. Timmer CP. The agricultural transformation. In H. Chenery & T. N. Srinivasan (Eds.), Handbook of development economics (Vol. 1, pp. 275–331). North-Holland, 1988.
39. Tran DD, van Halsema G, Hellegers PJGM, Ludwig F, Wyatt A. Questioning triple rice intensification on the Vietnamese Mekong delta floodplains: An environmental and economic analysis of current land-use trends and alternatives. Journal of Environmental Management. 2018; 217:429-441. Doi: https://doi.org/10.1016/j.jenvman.2018.03.116
40. World Bank. World development report 2008: Agriculture for development. World Bank, 2007.
41. World Bank. Transforming Vietnamese agriculture: Gaining more from less. Vietnam Development Report 2016. World Bank, 2016.