The Economic Viability of Small-Scale Farming in a Globalized Market

Abstract

Small-scale farming plays a crucial role in the global agricultural landscape, contributing significantly to food security, rural livelihoods, and ecological sustainability. However, the economic viability of small-scale farming is increasingly challenged by the forces of globalization, market volatility, and changing consumer preferences. This article explores the economic viability of small-scale farming in a globalized market, with a specific focus on the world, Asia, and India. Through a comprehensive analysis of primary and secondary data, including case studies, statistical reports, and policy documents, the article examines the key factors influencing the economic viability of small-scale farming, such as market access, agricultural policies, technological innovations, and sustainable practices. The findings reveal that while small-scale farming faces numerous challenges, it also presents opportunities for enhancing economic viability through targeted interventions, such as improving market linkages, promoting sustainable intensification, and leveraging traditional knowledge. The article concludes by proposing a framework for strengthening the economic viability of small-scale farming in a globalized market, emphasizing the need for inclusive policies, institutional support, and collaborative efforts among stakeholders.

Keywords: Small-Scale Farming, Economic Viability, Globalization, Market Access, Sustainable Intensification

Introduction

Small-scale farming, characterized by limited land holdings and family labor, is a dominant form of agriculture worldwide, particularly in developing countries [1]. According to the Food and Agriculture Organization (FAO), there are an estimated 500 million small-scale farms globally, supporting the livelihoods of around 2 billion people [2]. These farms play a vital role in ensuring food security, preserving biodiversity, and sustaining rural communities. However, the economic viability of small-scale farming is increasingly threatened by the forces of globalization, market competition, and changing consumer preferences [3].

In the context of a globalized market, small-scale farmers face numerous challenges in accessing markets, obtaining fair prices for their produce, and competing with large-scale commercial agriculture [4]. The liberalization of agricultural trade, coupled with the concentration of market power among a few multinational corporations, has further marginalized small-scale farmers [5]. Moreover, the increasing demand for standardized and processed food products has shifted the focus away from traditional and diverse crops grown by small-scale farmers [6].

Despite these challenges, small-scale farming continues to be a resilient and adaptable form of agriculture, with the potential to enhance economic viability through sustainable practices, local market development, and policy support [7]. This article aims to explore the economic viability of small-scale farming in a globalized market, with a specific focus on the world, Asia, and India,

because the economy of the country depends maximum on Agriculture. By examining the key factors influencing the economic viability of small-scale farming and proposing a framework for strengthening it, the article contributes to the ongoing discourse on sustainable agriculture and rural development.

Global Context of Small-Scale Farming

Prevalence and Significance of Small-Scale Farming

Small-scale farming is a prevalent form of agriculture worldwide, with an estimated 84% of all farms being less than 2 hectares in size [8]. These farms are particularly significant in developing countries, where they account for a substantial share of agricultural production and employment. For instance, in sub-Saharan Africa, small-scale farms contribute to 80% of the food supply and employ around 175 million people [9].

Region	Percentage of Small-Scale Farms
Sub-Saharan Africa	80%
South Asia	75%
East Asia and Pacific	70%
Latin America	60%
Middle East and North Africa	50%
Europe and Central Asia	40%
North America	20%

Table 1: Percentage of Small-Scale Farms by Region Source: FAO [10]

Challenges Faced by Small-Scale Farmers in a Globalized Market

Small-scale farmers face numerous challenges in the context of a globalized market, which can undermine their economic viability. These challenges include:

1. Limited market access: Small-scale farmers often lack access to lucrative markets due to poor infrastructure, information asymmetry, and limited bargaining power [11].
2. Price volatility: The globalization of agricultural markets has increased price volatility, exposing small-scale farmers to greater risks and uncertainties [12].
3. Competition from large-scale agriculture: Small-scale farmers struggle to compete with large-scale commercial farms that benefit from economies of scale and advanced technologies [13].
4. Changing consumer preferences: The increasing demand for standardized and processed food products has marginalized traditional and diverse crops grown by small-scale farmers [14].
5. Climate change: Small-scale farmers are particularly vulnerable to the impacts of climate change, such as droughts, floods, and extreme weather events [15].

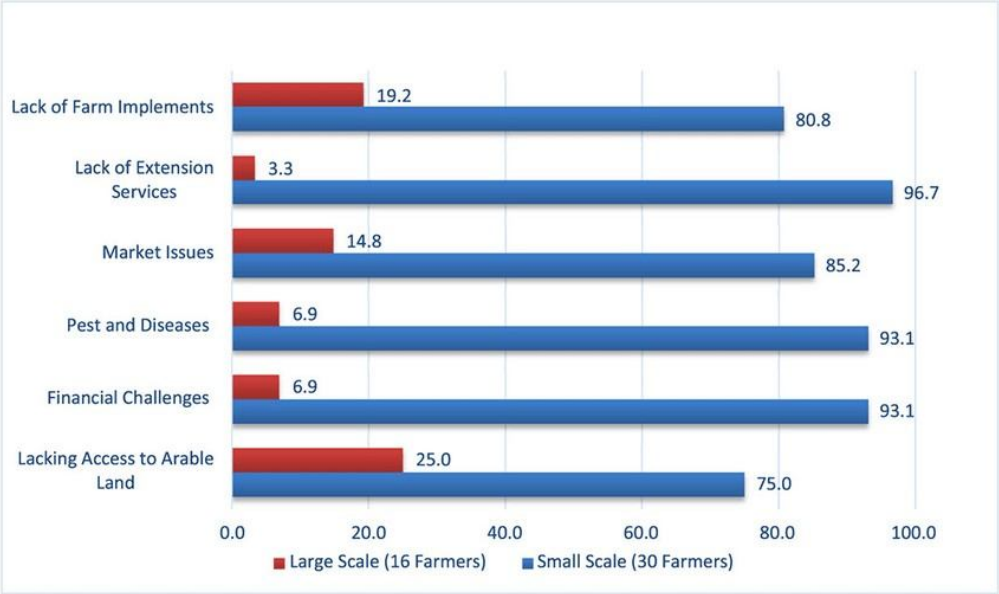

Figure 1: Challenges Faced by Small-Scale Farmers in a Globalized Market

Opportunities for Enhancing Economic Viability

Despite the challenges, small-scale farming presents opportunities for enhancing economic viability through sustainable practices, local market development, and policy support [16]. These opportunities include:

1. Sustainable intensification: Adopting sustainable practices, such as agroecology and conservation agriculture, can increase productivity while preserving natural resources [17].
2. Local market development: Strengthening local food systems and direct marketing channels can provide small-scale farmers with better prices and more stable demand [18].
3. Collective action: Forming cooperatives and farmer organizations can enhance small-scale farmers' bargaining power and access to markets, inputs, and services [19].
4. Diversification: Diversifying crops and income sources can reduce risks and increase resilience to market shocks and climate variability [20].
5. Policy support: Targeted policies and investments in infrastructure, extension services, and financial inclusion can create an enabling environment for small-scale farming [21].

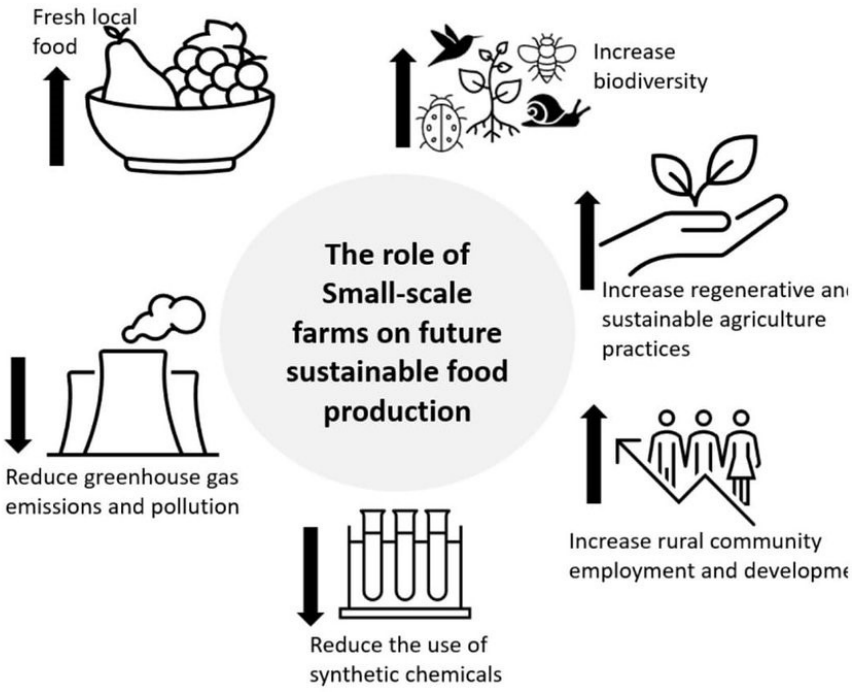

Figure 2: Opportunities for Enhancing Economic Viability of Small-Scale Farming

Small-Scale Farming in Asia

Overview of Small-Scale Farming in Asia

Asia is home to a significant proportion of the world's small-scale farmers, with an estimated 74% of all farms in the region being less than 1 hectare in size [22].Even Vietnam is a country where small-scale farming plays a significant role. These farms play a crucial role in ensuring food security, generating employment, and sustaining rural livelihoods. However, small-scale farmers in Asia face numerous challenges, such as limited access to resources, market volatility, and climate change [23].

Country	Percentage of Small-Scale Farms
China	90%
India	85%
Indonesia	80%
Vietnam	75%
Philippines	70%
Thailand	65%
Bangladesh	60%
Pakistan	55%

Table 2: Percentage of Small-Scale Farms in Selected Asian Countries Source: FAO [24]

Challenges and Opportunities for Small-Scale Farming in Asia

Small-scale farmers in Asia face several challenges that affect their economic viability, such as:

1. Land fragmentation: The increasing fragmentation of land holdings due to population growth and inheritance practices has led to smaller and less economically viable farms [25].

2. Limited access to resources: Small-scale farmers often lack access to credit, inputs, and extension services, which hinders their productivity and profitability [26].

3. Climate change: Asia is highly vulnerable to the impacts of climate change, with small-scale farmers being particularly affected by droughts, floods, and extreme weather events [27].

4. Market access: Small-scale farmers in Asia often face difficulties in accessing markets and obtaining fair prices for their produce due to poor infrastructure and limited bargaining power [28].

Despite these challenges, small-scale farming in Asia presents opportunities for enhancing economic viability through:

1. Sustainable intensification: Adopting sustainable practices, such as integrated pest management and organic farming, can increase productivity while reducing environmental impacts [29].

2. Collective action: Forming cooperatives and farmer organizations can enhance small-scale farmers' access to markets, inputs, and services, as well as improve their bargaining power [30].

3. Value addition: Engaging in value addition activities, such as processing and packaging, can increase the income and profitability of small-scale farmers [31].

4. Policy support: Governments in Asia have implemented various policies and programs to support small-scale farming, such as subsidies, credit schemes, and extension services [32].

Figure 3: Challenges and Opportunities for Small-Scale Farming in Asia

Case Study: Small-Scale Farming in Vietnam

Vietnam is a country where small-scale farming plays a significant role in the agricultural sector, with 90% of all farms being less than 2 hectares in size [33]. These farms contribute to 70% of the country's food production and employ around 50% of the rural workforce [34]. However, small-scale

farmers in Vietnam face challenges such as limited access to resources, market volatility, and climate change [35].

To address these challenges, the Vietnamese government has implemented various policies and programs to support small-scale farming, such as:

1. Land consolidation: The government has encouraged land consolidation to create larger and more economically viable farms, while ensuring that small-scale farmers retain their land rights [36].

2. Contract farming: The government has promoted contract farming arrangements between small-scale farmers and agribusinesses to ensure stable market access and fair prices [37].

3. Extension services: The government has invested in extension services to provide small-scale farmers with technical assistance, training, and access to inputs [38].

4. Climate change adaptation: The government has implemented various measures to help small-scale farmers adapt to climate change, such as promoting drought-resistant crops and investing in irrigation infrastructure [39].

These policies and programs have contributed to the economic viability of small-scale farming in Vietnam, with notable successes in the rice and coffee sectors [40]. However, challenges remain, such as the need for better coordination among stakeholders and more inclusive policies that benefit the most marginalized farmers [41].

Policy/Program	Description
Land consolidation	Encourage land consolidation to create larger and more economically viable farms
Contract farming	Promote contract farming arrangements between small-scale farmers and agribusinesses
Extension services	Provide technical assistance, training, and access to inputs to small-scale farmers
Climate change adaptation	Implement measures to help small-scale farmers adapt to climate change

Table 3: Key Policies and Programs Supporting Small-Scale Farming in Vietnam **Source**: [36], [37], [38], [39]

Small-Scale Farming in India

Overview of Small-Scale Farming in India

India is home to the largest number of small-scale farmers in the world, with an estimated 126 million small and marginal farmers, accounting for 86% of the total agricultural holdings in the country [42]. These farmers play a crucial role in ensuring food security, generating employment, and sustaining rural livelihoods. However, small-scale farmers in India face numerous challenges, such as limited access to resources, market volatility, and climate change [43].

Size of Holding (hectares)	Number of Holdings (million)	Percentage of Total Holdings
Less than 0.5	71.2	51.2%

0.5 - 1.0	31.8	22.9%
1.0 - 2.0	23.1	16.6%
2.0 - 3.0	7.6	5.5%
3.0 - 4.0	3.1	2.2%
4.0 - 5.0	1.4	1.0%
5.0 - 10.0	1.0	0.7%
10.0 and above	0.2	0.1%

Table 4: Distribution of Agricultural Holdings in India by Size **Source**: Agricultural Census 2015-16, Government of India [44]

Challenges and Opportunities for Small-Scale Farming in India

Small-scale farmers in India face several challenges that affect their economic viability, such as:

1. Fragmented land holdings: The increasing fragmentation of land holdings due to population growth and inheritance laws has led to smaller and less economically viable farms [45].
2. Limited access to resources: Small-scale farmers often lack access to credit, inputs, and extension services, which hinders their productivity and profitability [46].
3. Climate change: India is highly vulnerable to the impacts of climate change, with small-scale farmers being particularly affected by droughts, floods, and extreme weather events [47].
4. Market access: Small-scale farmers in India often face difficulties in accessing markets and obtaining fair prices for their produce due to poor infrastructure and limited bargaining power [48].

Despite these challenges, small-scale farming in India presents opportunities for enhancing economic viability through:

1. Sustainable intensification: Adopting sustainable practices, such as integrated nutrient management and precision farming, can increase productivity while reducing environmental impacts [49].
2. Collective action: Forming cooperatives and farmer producer organizations (FPOs) can enhance small-scale farmers' access to markets, inputs, and services, as well as improve their bargaining power [50].
3. Diversification: Diversifying crops and income sources, such as integrating livestock and horticulture, can reduce risks and increase resilience to market shocks and climate variability [51].
4. Policy support: The Indian government has implemented various policies and programs to support small-scale farming, such as the Pradhan Mantri Kisan Samman Nidhi (PM-KISAN) scheme and the National Mission for Sustainable Agriculture (NMSA) [52].

Challenges	Households affected		Rank
	No.	Percentage	
Infrastructure shortage(power)	81	53.29	1
Shortage of money	64	42.11	2
Shortage of interest	30	18.73	3
Format in which the information is packaged	19	12.5	4
Maintenance problem	19	12.5	4
Shortage of locally specified information	19	11.85	4
Inadequate users knowledge	18	11.85	7
Distance to the information sources	15	9.87	8
Maintenance problem	7	4.61	10
Shortage of timely delivered information	4	2.63	11
Low capacity of the information sources	3	1.97	12
resources of the model farmers and ours is imbalance	2	1.32	13
Work overload	1	0.66	14

Multiple responses were allowed.

Figure 4: Challenges and Opportunities for Small-Scale Farming in India

Case Study: Farmer Producer Organizations (FPOs) in India

Farmer Producer Organizations (FPOs) have emerged as a promising model for enhancing the economic viability of small-scale farming in India [53]. FPOs are voluntary associations of farmers, primarily small and marginal farmers, who come together to collectively engage in production, processing, and marketing activities [54]. By pooling their resources and bargaining power, FPOs enable small-scale farmers to access markets, inputs, and services more effectively [55].

The Indian government has recognized the potential of FPOs in supporting small-scale farming and has implemented various policies and programs to promote their growth, such as:

1. Equity Grant Scheme: The government provides financial assistance to FPOs in the form of equity grants to enhance their capital base and viability [56].
2. Credit Guarantee Fund Scheme: The government has established a credit guarantee fund to facilitate the flow of credit to FPOs from financial institutions [57].
3. Capacity Building: The government has launched various initiatives to build the capacity of FPOs through training, exposure visits, and technical assistance [58].
4. Market Linkages: The government has promoted market linkages for FPOs through e-NAM (National Agriculture Market), a pan-India electronic trading portal, and other market interventions [59].

These policies and programs have contributed to the growth of FPOs in India, with over 7,000 FPOs registered as of 2021 [60]. However, challenges remain, such as the need for more sustainable business models, better governance structures, and more inclusive participation of women and marginalized farmers [61].

Year	Number of FPOs Registered
2014	256
2015	612

2016	1,052
2017	1,754
2018	2,872
2019	4,323
2020	5,886
2021	7,374

Table 5: Growth of Farmer Producer Organizations (FPOs) in India Source: NABARD [62]

Framework for Strengthening Economic Viability of Small-Scale Farming

Based on the analysis of the challenges and opportunities faced by small-scale farmers in a globalized market, a framework for strengthening the economic viability of small-scale farming is proposed. The framework consists of four key pillars:

1. Inclusive policies: Governments should implement policies that are inclusive and responsive to the needs of small-scale farmers, such as land tenure security, credit access, and social protection [63].

2. Institutional support: Strengthening institutions that support small-scale farming, such as cooperatives, farmer organizations, and extension services, can enhance their access to markets, inputs, and services [64].

3. Sustainable practices: Promoting sustainable agricultural practices, such as agroecology, conservation agriculture, and organic farming, can increase productivity while preserving natural resources and enhancing resilience to climate change [65].

4. Collaborative efforts: Fostering collaboration among stakeholders, such as governments, civil society organizations, private sector,, and research institutions, can create synergies and enable the sharing of knowledge, resources, and best practices to support small-scale farming [66].

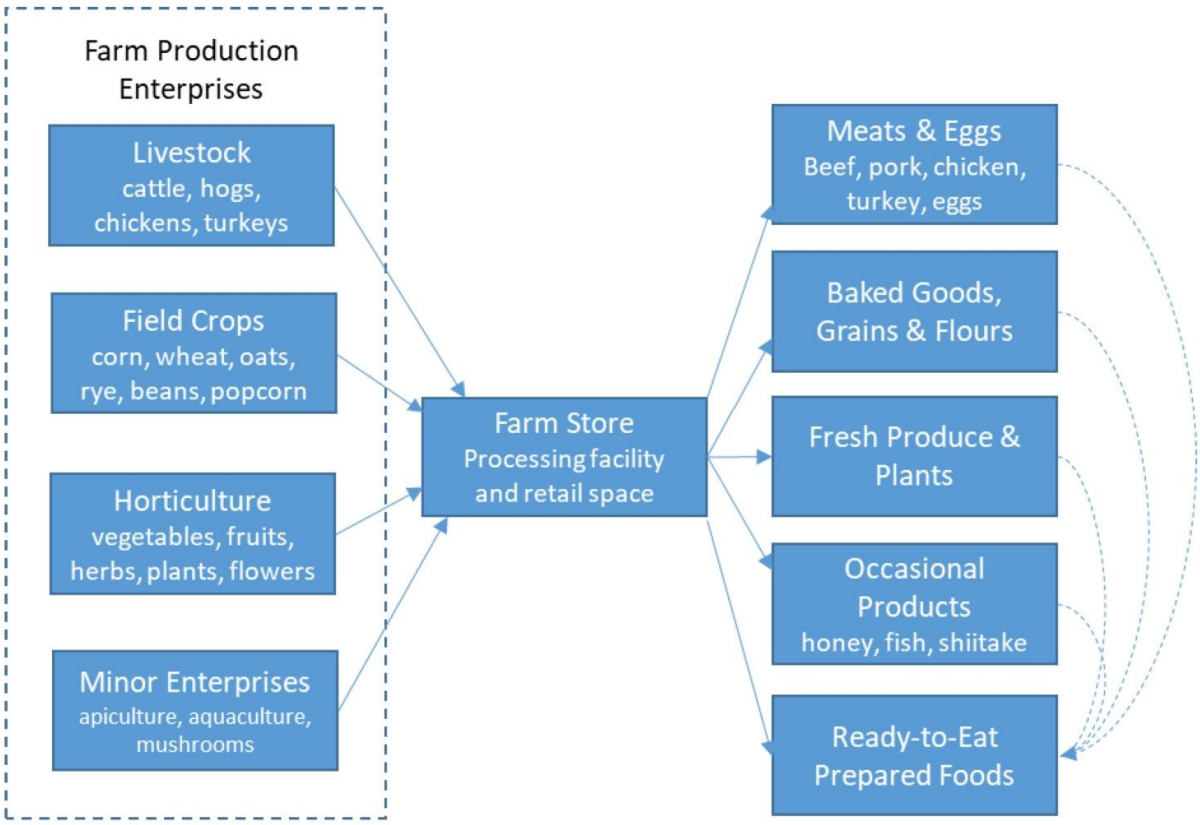

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Figure 5: Framework for Strengthening Economic Viability of Small-Scale Farming

Conclusion

Small-scale farming plays a vital role in the global agricultural landscape, contributing significantly to food security, rural livelihoods, and ecological sustainability. However, the economic viability of small-scale farming is increasingly challenged by the forces of globalization, market volatility, and changing consumer preferences. This article has explored the economic viability of small-scale farming in a globalized market, with a specific focus on the world, Asia,Vietnam and India.The analysis of the challenges and opportunities faced by small-scale farmers has revealed that while they face numerous obstacles, such as limited market access, price volatility, and climate change, there are also opportunities for enhancing their economic viability through sustainable practices, collective action, and policy support. The case studies of small-scale farming in Vietnam and India have highlighted the potential of targeted interventions, such as land consolidation, contract farming, and farmer producer organizations, in strengthening the economic viability of small-scale farming.The proposed framework for strengthening the economic viability of small-scale farming emphasizes the need for inclusive policies, institutional support, sustainable practices, and collaborative efforts among stakeholders. By adopting this framework, governments, civil society organizations, and other stakeholders can work together to create an enabling environment for small-scale farming to thrive in a globalized market.

Disclaimer (Artificial intelligence)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of manuscripts.

References

[1] FAO. (2014). The state of food and agriculture: Innovation in family farming. Food and Agriculture Organization of the United Nations. http://www.fao.org/3/a-i4040e.pdf

[2] FAO. (2014). The state of food and agriculture: Innovation in family farming. Food and Agriculture Organization of the United Nations. http://www.fao.org/3/a-i4040e.pdf

[3] Hazell, P., Poulton, C., Wiggins, S., & Dorward, A. (2010). The future of small farms: Trajectories and policy priorities. World Development, 38(10), 1349-1361. https://doi.org/10.1016/j.worlddev.2009.06.012

[4] Wiggins, S., Kirsten, J., &Llambí, L. (2010). The future of small farms. World Development, 38(10), 1341-1348. https://doi.org/10.1016/j.worlddev.2009.06.013

[5] Vorley, B., Cotula, L., & Chan, M. K. (2012). Tipping the balance: Policies to shape agricultural investments and markets in favour of small-scale farmers. Oxfam International. https://www.oxfam.org/en/research/tipping-balance

[6] Hazell, P., Poulton, C., Wiggins, S., & Dorward, A. (2010). The future of small farms: Trajectories and policy priorities. World Development, 38(10), 1349-1361. https://doi.org/10.1016/j.worlddev.2009.06.012

[7] Wiggins, S., Kirsten, J., &Llambí, L. (2010). The future of small farms. World Development, 38(10), 1341-1348. https://doi.org/10.1016/j.worlddev.2009.06.013

[8] Lowder, S. K., Skoet, J., & Raney, T. (2016). The number, size, and distribution of farms, smallholder farms, and family farms worldwide. World Development, 87, 16-29. https://doi.org/10.1016/j.worlddev.2015.10.041

[9] FAO. (2014). The state of food and agriculture: Innovation in family farming. Food and Agriculture Organization of the United Nations. http://www.fao.org/3/a-i4040e.pdf

[10] FAO. (2014). The state of food and agriculture: Innovation in family farming. Food and Agriculture Organization of the United Nations. http://www.fao.org/3/a-i4040e.pdf

[11] Barrett, C. B. (2008). Smallholder market participation: Concepts and evidence from eastern and southern Africa. Food Policy, 33(4), 299-317. https://doi.org/10.1016/j.foodpol.2007.10.005

[12] Minot, N. (2014). Food price volatility in sub-Saharan Africa: Has it really increased?. Food Policy, 45, 45-56. https://doi.org/10.1016/j.foodpol.2013.12.008

[13] Hazell, P., Poulton, C., Wiggins, S., & Dorward, A. (2010). The future of small farms: Trajectories and policy priorities. World Development, 38(10), 1349-1361. https://doi.org/10.1016/j.worlddev.2009.06.012

[14] Reardon, T., Timmer, C. P., Barrett, C. B., &Berdegué, J. (2003). The rise of supermarkets in Africa, Asia, and Latin America. American Journal of Agricultural Economics, 85(5), 1140-1146. https://doi.org/10.1111/j.0092-5853.2003.00520.x

[15] Morton, J. F. (2007). The impact of climate change on smallholder and subsistence agriculture. Proceedings of the National Academy of Sciences, 104(50), 19680-19685. https://doi.org/10.1073/pnas.0701855104

[16] Wiggins, S., Kirsten, J., & Llambí, L. (2010). The future of small farms. World Development, 38(10), 1341-1348. https://doi.org/10.1016/j.worlddev.2009.06.013

[17] Pretty, J., Toulmin, C., & Williams, S. (2011). Sustainable intensification in African agriculture. International Journal of Agricultural Sustainability, 9(1), 5-24. https://doi.org/10.3763/ijas.2010.0583

[18] King, R. P., Hand, M. S., DiGiacomo, G., Clancy, K., Gómez, M. I., Hardesty, S. D., ... & McLaughlin, E. W. (2010). Comparing the structure, size, and performance of local and mainstream food supply chains (No. 1473-2016-120675). https://doi.org/10.22004/ag.econ.99385

[19] Markelova, H., Meinzen-Dick, R., Hellin, J., & Dohrn, S. (2009). Collective action for smallholder market access. Food Policy, 34(1), 1-7. https://doi.org/10.1016/j.foodpol.2008.10.001

[20] Birthal, P. S., Joshi, P. K., & Gulati, A. (2005). Vertical coordination in high-value food commodities: Implications for smallholders (No. 595-2016-40058). https://doi.org/10.22004/ag.econ.59422

[21] Poulton, C., Dorward, A., & Kydd, J. (2010). The future of small farms: New directions for services, institutions, and intermediation. World Development, 38(10), 1413-1428. https://doi.org/10.1016/j.worlddev.2009.06.009

[22] FAO. (2014). The state of food and agriculture: Innovation in family farming. Food and Agriculture Organization of the United Nations. http://www.fao.org/3/a-i4040e.pdf

[23] Thapa, G., &Gaiha, R. (2011). Smallholder farming in Asia and the Pacific: Challenges and opportunities. In New directions for smallholder agriculture. Oxford University Press. https://doi.org/10.1093/acprof:oso/9780199689347.003.0003

[24] FAO. (2014). The state of food and agriculture: Innovation in family farming. Food and Agriculture Organization of the United Nations. http://www.fao.org/3/a-i4040e.pdf

[25] Hazell, P. (2015). Is small farm led development still a relevant strategy for Africa and Asia?. In The fight against hunger and malnutrition: The role of food, agriculture, and targeted policies. Oxford University Press. https://doi.org/10.1093/acprof:oso/9780198733201.003.0008

[26] Thapa, G., &Gaiha, R. (2011). Smallholder farming in Asia and the Pacific: Challenges and opportunities. In New directions for smallholder agriculture. Oxford University Press. https://doi.org/10.1093/acprof:oso/9780199689347.003.0003

[27] Hijioka, Y., Lin, E., Pereira, J. J., Corlett, R. T., Cui, X., Insarov, G. E., ... & Surjan, A. (2014). Asia. In Climate change 2014: Impacts, adaptation, and vulnerability. Part B: Regional aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press. https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap24_FINAL.pdf

[28] Otsuka, K. (2013). Food insecurity, income inequality, and the changing comparative advantage in world agriculture. Agricultural Economics, 44(s1), 7-18. https://doi.org/10.1111/agec.12046

[29] Pretty, J., Toulmin, C., & Williams, S. (2011). Sustainable intensification in African agriculture. International Journal of Agricultural Sustainability, 9(1), 5-24. https://doi.org/10.3763/ijas.2010.0583

[30] Markelova, H., Meinzen-Dick, R., Hellin, J., & Dohrn, S. (2009). Collective action for smallholder market access. Food Policy, 34(1), 1-7. https://doi.org/10.1016/j.foodpol.2008.10.001

[31] Birthal, P. S., Joshi, P. K., & Gulati, A. (2005). Vertical coordination in high-value food commodities: Implications for smallholders (No. 595-2016-40058). https://doi.org/10.22004/ag.econ.59422

[32] Gulati, A., Minot, N., Delgado, C., & Bora, S. (2007). Growth in high-value agriculture in Asia and the emergence of vertical links with farmers. In Global supply chains, standards and the poor: How the globalization of food systems and standards affects rural development and poverty (pp. 91-108). CAB International. https://doi.org/10.1079/9781845931858.0091

[33] FAO. (2014). The state of food and agriculture: Innovation in family farming. Food and Agriculture Organization of the United Nations. http://www.fao.org/3/a-i4040e.pdf

[34] Tarp, F., Vinh, D. Q., Tuyen, T. Q., & Nielsen, C. P. (2017). Growth, structural transformation, and rural change in Viet Nam: A rising dragon on the move. Oxford University Press. https://doi.org/10.1093/acprof:oso/9780198796961.001.0001

[35] Thapa, G., &Gaiha, R. (2011). Smallholder farming in Asia and the Pacific: Challenges and opportunities. In New directions for smallholder agriculture. Oxford University Press. https://doi.org/10.1093/acprof:oso/9780199689347.003.0003

[36] Nguyen, T. T., Nguyen, L. D., Lippe, R. S., & Grote, U. (2017). Determinants of farmers' land use decision-making: Comparative evidence from Thailand and Vietnam. World Development, 89, 199-213. https://doi.org/10.1016/j.worlddev.2016.08.010

[37] Nguyen, T. A., Bui, C. T., Nguyen, T. T., & Grote, U. (2021). Contract farming in Vietnam: Implications for smallholders and the role of government support. Food Policy, 102, 102101. https://doi.org/10.1016/j.foodpol.2021.102101

[38] Nguyen, T. T., Nguyen, L. D., Lippe, R. S., & Grote, U. (2017). Determinants of farmers' land use decision-making: Comparative evidence from Thailand and Vietnam. World Development, 89, 199-213. https://doi.org/10.1016/j.worlddev.2016.08.010

[39] Trinh, Q., Rañola Jr, R. F., Camacho, L. D., & Simelton, E. (2018). Determinants of farmers' adaptation to climate change in agricultural production in the central region of Vietnam. Land Use Policy, 70, 224-231. https://doi.org/10.1016/j.landusepol.2017.10.023

[40] Tarp, F., Vinh, D. Q., Tuyen, T. Q., & Nielsen, C. P. (2017). Growth, structural transformation, and rural change in Viet Nam: A rising dragon on the move. Oxford University Press. https://doi.org/10.1093/acprof:oso/9780198796961.001.0001

[41] Nguyen, T. A., Bui, C. T., Nguyen, T. T., & Grote, U. (2021). Contract farming in Vietnam: Implications for smallholders and the role of government support. Food Policy, 102, 102101. https://doi.org/10.1016/j.foodpol.2021.102101

[42] NABARD. (2021). Farmer producer organisations. National Bank for Agriculture and Rural Development. https://www.nabard.org/content.aspx?id=2719

[43] Panda, S. (2021). Sustainable agriculture in India 2021: What we know and how to scale up. Council on Energy, Environment and Water. https://www.ceew.in/publications/sustainable-agriculture-india

[44] Government of India. (2019). Agriculture census 2015-16. Ministry of Agriculture and Farmers Welfare. http://agcensus.nic.in/document/agcen1516/T1_ac_2015_16.pdf

[45] Chand, R., Prasanna, P. L., & Singh, A. (2011). Farm size and productivity: Understanding the strengths of smallholders and improving their livelihoods. Economic and Political Weekly, 46(26-27), 5-11. https://www.epw.in/journal/2011/26-27/review-rural-affairs-review-issues-specials/farm-size-and-productivity.html

[46] Panda, S. (2021). Sustainable agriculture in India 2021: What we know and how to scale up. Council on Energy, Environment and Water. https://www.ceew.in/publications/sustainable-agriculture-india

[47] Palanisami, K., Ranganathan, C. R., Kakumanu, K. R., & Udaya Sekhar Nagothu. (2015). Climate change and agriculture in India: Studies from selected river basins. Routledge. https://doi.org/10.4324/9781315734361

[48] Gulati, A., & Juneja, R. (2021). Indian agriculture towards 2030: Pathways for enhancing farmers' income, nutritional security and sustainable food systems. NITI Aayog. https://www.niti.gov.in/sites/default/files/2021-01/IndianAgricultureTowards2030.pdf

[49] Panda, S. (2021). Sustainable agriculture in India 2021: What we know and how to scale up. Council on Energy, Environment and Water. https://www.ceew.in/publications/sustainable-agriculture-india

[50] NABARD. (2021). Farmer producer organisations. National Bank for Agriculture and Rural Development. https://www.nabard.org/content.aspx?id=2719

[51] Birthal, P. S., Roy, D., & Negi, D. S. (2015). Assessing the impact of crop diversification on farm poverty in India. World Development, 72, 70-92. https://doi.org/10.1016/j.worlddev.2015.02.015

[52] Government of India. (2021). National mission for sustainable agriculture. Ministry of Agriculture and Farmers Welfare. https://nmsa.dac.gov.in/

[53] NABARD. (2021). Farmer producer organisations. National Bank for Agriculture and Rural Development. https://www.nabard.org/content.aspx?id=2719

[54] Trebbin, A., & Hassler, M. (2012). Farmers' producer companies in India: A new concept for collective action?. Environment and Planning A, 44(2), 411-427. https://doi.org/10.1068/a44143

[55] Trebbin, A. (2014). Linking small farmers to modern retail through producer organizations–Experiences with producer companies in India. Food Policy, 45, 35-44. https://doi.org/10.1016/j.foodpol.2013.12.007

[56] SFAC. (2021). Equity grant scheme. Small Farmers' Agribusiness Consortium. http://sfacindia.com/Equity-Grant-Scheme.aspx

[57] SFAC. (2021). Credit guarantee fund scheme. Small Farmers' Agribusiness Consortium. http://sfacindia.com/Credit-Guarantee-Fund-Scheme.aspx

[58] NABARD. (2021). Farmer producer organisations. National Bank for Agriculture and Rural Development. https://www.nabard.org/content.aspx?id=2719

[59] Government of India. (2021). e-NAM. Ministry of Agriculture and Farmers Welfare. https://enam.gov.in/web/

[60] NABARD. (2021). Farmer producer organisations. National Bank for Agriculture and Rural Development. https://www.nabard.org/content.aspx?id=2719

[61] Nikam, V., Singh, S., Ashok, A., Kadam, V., & Jagadeesan, V. (2019). Performance and sustainability of farmer producer companies in India: A temporal analysis. Indian Journal of Agricultural Sciences, 89(9), 1416-1422. https://www.researchgate.net/publication/337144139_Performance_and_sustainability_of_farmer_producer_companies_in_India_A_temporal_analysis

[62] NABARD. (2021). Farmer producer organisations. National Bank for Agriculture and Rural Development. https://www.nabard.org/content.aspx?id=2719

[63] Vorley, B., Cotula, L., & Chan, M. K. (2012). Tipping the balance: Policies to shape agricultural investments and markets in favour of small-scale farmers. Oxfam International. https://www.oxfam.org/en/research/tipping-balance

[64] Poulton, C., Dorward, A., & Kydd, J. (2010). The future of small farms: New directions for services, institutions, and intermediation. World Development, 38(10), 1413-1428. https://doi.org/10.1016/j.worlddev.2009.06.009

[65] Pretty, J., Toulmin, C., & Williams, S. (2011). Sustainable intensification in African agriculture. International Journal of Agricultural Sustainability, 9(1), 5-24. https://doi.org/10.3763/ijas.2010.0583

[66] Hazell, P., Poulton, C., Wiggins, S., & Dorward, A. (2010). The future of small farms: Trajectories and policy priorities. World Development, 38(10), 1349-1361. https://doi.org/10.1016/j.worlddev.2009.06.012