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International Agricultural Research**

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Workshop: Climate Adaptation and Inclusive Development  
in the Agricultural Sector for South Asia

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## 2 Executive summary

### *Supporting inclusive recovery in South Asia*

Rising global economic, geo-political and climate-related uncertainties pose significant challenges in South Asia. In particular, the COVID-19 pandemic has exposed systemic weaknesses in the global economy, highlighting the need for effective collective action mechanisms to generate and safeguard public goods and facilitate a more inclusive recovery.

For the countries in South Asia, which outperformed other developing regions in the pre COVID-19 era, they are now facing unprecedented impacts of an abrupt economic slowdown, the major effect of which has been on the most vulnerable, and the young, whose prospects for an improved quality of life, are increasingly problematic.

### *Addressing inequities and capacity constraints*

There is now greater recognition of the need to realign the development focus of South Asian countries to address economic, social, and environmental inequities that underlie lagging development progress, and thereby promote a greater level of well-being across communities and generations. It follows that there is an urgent need to reassure the youth cohort within the populations of South Asian countries that their views are embodied in decisions that impact their future. This relates closely to designing policies for adapting to climate change due to its broad implications and longer time horizons. Hence addressing barriers to effective policy development for inclusive growth has become a priority, especially in the South Asian region where significant capacity constraints impede progress towards streamlining climate adaptation within the broader policy ambit.

This short research activity (SRA) was therefore aimed at identifying key impediments to effective policy development and lay a foundation for building capacity in the policy-research interface for agricultural and rural economic transformation in South Asia, taking climate adaptation for inclusive development as the motivating goal.

### *Workshop held in Kathmandu – a forum for development dialogue*

A key aspect of the SRA was the holding of a regional workshop in Kathmandu Nepal, targeted to impart skills and capability building of a group of middle level professionals with expertise and interest in development practice. The aim was to enhance their mediating and influencing skills through policy analysis, design, and impact communication.

To bring South Asia's multi-faceted development challenges into focus and highlight opportunities for public policy enrichment, a position paper was developed to complement the training modules supported by thematic presentations and active learning opportunities with resource personnel, targeting key development challenges. Trainees were thus able to critically evaluate the content of the position paper, deliberate on ideas shared in fellow trainees' presentations, and work with facilitators to jointly identify key investment priorities in their own context. Since the workshop, trainees engaging with key resource persons, including to draft a book chapter on their chosen problem, which will illustrate the process of identifying development priorities in their local context and the tools and techniques used in the process of analysing options and assessing implementation challenges. Overall, this project has helped

develop skills and confidence in policy planning and deliberation and create a network that nurtures continuous professional development.

### *Process for mentoring and professional development*

Prior to the workshop, the trainees were able to work with the trainers and resource personnel to identify and prioritise key issues. This was done by working through examples of policy barriers that they brought to the workshop for collective determination of solution pathways, using available evidence and support networks. The workshop was thus designed to facilitate south-south dialogue amongst aspiring development practitioners and offer a conduit for sharing Australian expertise and experience in agricultural and rural development. This included lessons learnt in prior ACIAR, ADBI and related global research and development activities. In this way the workshop's aim was to foster a community of economists and allied practitioners interested in progressing South Asia, within the region and beyond, through targeted dissemination activities.

The project proponents: A/Prof Thilak Mallawaarachchi, Prof Clevo Wilson, Dr Rajendra Adhikari, and Dr Dil Rahut (ADBI), have significant prior experience and wide expertise in policy research and capacity building activities in the region and beyond. Partners collaborating in this research—ACIAR, the Asian Development Bank Institute (ADBI), Queensland University of Technology (QUT) Centre for Agriculture and the Bioeconomy and the University of Queensland (UQ)—have enduring interests in and a focus on capacity building for sustainable agricultural development, including agricultural systems that are more resilient to climate change. The workshop drew on expertise from relevant professionals for resource people, including from CGIAR. The Institute of Policy Studies in Sri Lanka led the development of a position paper while the ADBI facilitated and bore the participation costs of trainees, the venue hire and some facilitation activities. ACIAR funds also supported the participation costs of trainers and IPS, background research and course development. The project leaders are now working to develop the course material and case studies as an edited book that will draw on workshop contributions, discussions and insights for development learning and practice.

### *Merit-based participation*

Participation in the workshop, held in Kathmandu during the week beginning 12th June 2023, was based on an open call to submit an expression of interest (EOI). The EOIs were expected to relate to the ongoing crisis for the South Asian region related to ongoing debt and deficit burden, the growing need to adapt to climate and social change and managing an economic recovery in the midst of an international economic disruption due variously to post COVID19 inflation and the war in Ukraine. Following the receipt of EOIs, a group was selected and invited to work in developing a paper and a presentation for the workshop. That was to be based on an analysis of a chosen issue and related policy impediments, supported by evidence drawn from data sets or a detailed case study and provision of insights for follow-up action. Given the available budget, participation was limited to 15 trainees. The aim was to choose 2-3 trainees from each country from Bangladesh, Bhutan, India, Nepal, Pakistan, and Sri Lanka to represent regional heterogeneity in the development context. Given the focus in capacity building for effective public policy, a combination of two government officials and one academic person from each country was deemed desirable. Work presented would be their own although with approval to participate from their employers.

The costs of participation were borne by project collaborators as was mentoring support for content for the book.

### *Partnering for development learning and practice*

Given the prominence of agriculture and the rural economy in all countries in the South Asian region, they represent foci for combating poverty, inequity and creating economic prosperity across sectors, particularly given the urgent need to prepare for likely exacerbation of vulnerabilities because of climate change. The focus of the position paper was closely aligned to inclusive agricultural and rural transformation—an agreed development priority in partner countries and that of Australia and the ADBI.

The position paper thus provides a snapshot of well-being indicators in the South Asia region, relating to agriculture and the rural economy and a comparison across South Asian economies. Drawing on the OECD well-being framework, it included relevant indicators of well-being across the three dimensions: economic, social and environmental. These trends were compared with those of other regions where data availability permitted.

The project outputs thus include a position paper on the current context and development capacity building priorities and this project completion report. The project team is working with an international publisher to develop a book which will include papers developed by participants and resource persons. As such it would provide a widely available document which can guide development learning and practice.



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## 3 Background

### *Issues*

The world's adjustment to economic impacts of the COVID-19 pandemic has been moderated by several global economic, geo-political and climate-related uncertainties. Countries of South Asia, which outperformed other developing regions in the pre COVID-19 era, are now facing unprecedented impacts of prolonged economic slowdown. Impacts are most profound on the vulnerable, and the youth, whose prospects for an improved quality of life have been severely disrupted. Many countries in South Asia have depleted their financial reserves in fighting the pandemic, with heavily indebted countries such as Sri Lanka faring particularly badly. In 2022, the debt to GDP ratio stood at 75% for emerging and developing Asia, compared to 56% in 2019. Much of this increase is COVID induced, but also a result of debt financed growth in the previous decades that failed to offer meaningful income growth (Lau et al., 2022). Widespread natural disasters and the Russian war on Ukraine have exacerbated the risk of exposure to significant longer-term financial and economic losses and has resulted in widespread community hardship (Mallawaarachchi and Rahut 2023). Countries such as Australia have helped in the immediate crisis management, but sustained recovery in South Asia involves careful planning and re-evaluation of development policies.

There is greater recognition of the need to realign the development focus to inequities in economic, social and environmental well-being across communities and generations. There is also an urgent need to reassure younger people that their views are embodied in decisions that impact their futures—such as those relating to climate change. Hence addressing barriers to effective policy development for inclusive growth has become a priority, especially in regions where significant capacity constraints impede progress towards streamlining climate adaption within broader policy development. This activity thus focussed on training and capacity building of a group of emerging policy practitioners. It provided a sound basis to explore capacity building needs and investment opportunities for research and development and the role for public policies and programs to incentivise long-term agricultural development as a basis to enhance the effectiveness of future work.

South Asia outperformed the rest of the world in pre-Covid economic growth. However, vulnerabilities relating to a heavy reliance on external trade, tourism and remittances and wide inequalities in income and access to services, severely undermined the capacity to withstand external shocks and hence derailed economic development. In turn, this has caused a serious degrading of human capital across South Asia. Whilst the better educated are being driven to seek opportunities in wealthy countries, the poor—particularly the young and adolescents—are exposed to decades of poverty, undernutrition, and social deprivation, unless a sustained recovery can be supported with careful planning and priority setting.

The World Bank notes that across South Asia, the number of people unemployed, or not enrolled in education or training has increased substantially. Moreover, in several countries, there has been little sign of recovery after 18 months (Schady et al. 2023). Although development assistance is flowing, a lack of capacity for planning and implementation acts as a serious barrier to improving development effectiveness. Enhancing capacity to resolve competing trade-offs in a constrained fiscal environment, identifying complementarities in investments and targeting investments with greater multiplier effects are seen as crucial to support to ongoing development.

Foreign aid has made a significant and measurable development impact on countries such as Sri Lanka (Mohamed Aslam and Samsudeen 2021). However, capacity constraints have diminished the effectiveness of investments and hence deprived people of the full benefit of investments in creating sustainable growth (Feeny and Vuong 2017).

## **The opportunity**

The need for this capacity building activity was highlighted during previous ACIAR research and project reviews in Pakistan and in the implementation of ongoing work in Pakistan and Sri Lanka. That experience showed how capacity constraints impede the process of evidence-based policy development: inadequate consideration of local context and process understanding amongst development practitioners affect poor choice of policy instruments, produce inappropriate priorities and hence lead to failure in reaching targeted goals in investments. Whilst cultural change is hard to instil through a short course, when training is focused on promoting deliberative thinking it promotes capacity to make better decisions, creating a support network and assists in long-term human capital development and effective utilisation of existing resources, including foreign aid (Horowitz, et al., 2021).

Australia is working with partners in South Asia towards the goal of assuring a stable, prosperous, and resilient region. This includes addressing challenges including ongoing extreme poverty, conflict, and gender-based violence, all impacting on the capacity to adapt to climate change and deprivations exacerbated by the pandemic. This activity is contributing to Australia's development focus in South Asia in addressing transboundary challenges and deploying Australian expertise in climate adaptation, water resources, agribusiness, trade and infrastructure to support long-term stability and economic recovery.

This activity was jointly developed and implemented with the support of the Capacity Building and Training arm of the Asian Development Bank Institute (ADBI), where capacity building for climate adaptation is a specific objective. Adapting to climate change and mitigating its impacts are a stated priority in all countries in South Asia. Much of that effort involves realigning development priorities to safeguard assets and communities through investments in policies and programs that build resilience (Schady et al. 2023) and address fragility, conflict and violence that almost always are rooted in poverty and deprivation (Ejaz and Mallawaarachchi 2023).

## **Impact pathway**

This activity will continue to complement and contribute to enhancing the effectiveness of existing ACIAR research in South Asia in addressing poverty alleviation through agricultural and rural development. It offered a foundation for understanding the policy-research interface development priorities and how future investments may be directed to address such priorities, including for climate adaptation and broader inclusive development. Streamlining climate adaptation in sectoral and central development plans is crucial to achieve effective climate adaptation. Advanced economies, including Australia are already doing this.

Collaboration with ADBI enabled the sharing of experiences and in understanding ways to enhance the effectiveness of reaching goals in capacity building and priority setting for climate adaptation and inclusive development in South Asia. This has facilitated ADBI's role in informing development priorities by highlighting new opportunities to bridge capacity constraints including in problem identification and knowledge dissemination within the Asian Development Bank member nations. More broadly, the activity drew on resource material from the World Bank, the OECD and other development partners, including the CGIAR system. The book that will be produced as an ancillary output, will record contributions from participants in the workshop with course material which will provide a resource for future development planning and priority setting.

The activity involved the participation of Prof Shunsuke Managi, a co-author of *The Inclusive Wealth Index* (Managi and Kumar 2018), who provided important insights into challenges in harnessing long-term economic growth and human well-being. He described how the wealth of nations could be improved through a comprehensive analysis of a country's productive base including produced, human and natural capital, to create and maintain human well-being over time.

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## 4 Objectives

This research activity was aimed at understanding key impediments to effective policy development and laying a foundation for building capacity in the policy-research interface for agricultural and rural economic transformation in South Asia.

The objectives were to:

1. Conduct a regional workshop, targeting skills and capability building of a group of middle level professionals in development practice, aiming to enhance mediating and influencing skills through policy analysis, design and impact communication.
2. Develop a position paper to analyse and assess the prevailing development context and identify policy-research capacity development needs for South Asia.
3. Assemble course material, papers and lessons learnt during activity planning and workshop deliberations and place them into a published resource book.

The project undertook a regional workshop from 12-16 June 2023 in Kathmandu, Nepal. It served to establish a network to facilitate ongoing capacity building of a select set (15-18) of development professionals engaged in public policy planning and development from 6 South Asia countries i.e., Bangladesh, Bhutan, India, Pakistan, Nepal, and Sri Lanka.

This activity was undertaken with the support of the Asian Development Bank Institute (ADBI) through a deliberative process to build policy influence capacity of the trainees. The focus was on helping trainees identify the skills and capacities and networks needed to increase their influence in the policy environment in which they work. Training was focussed on improving policy, planning and investment strategy choice for climate adaptation and inclusive development within agriculture and food sectors in South Asia.

- ADBI covered the cost of trainee attendance, the venue costs and related expenses for 30 attendees in total.
- ACIAR funds were used for participation and research costs of facilitators and trainers from Australia and the honoraria for Prof Shunsuke Managi to attend from Japan. ADBI.

### **Recruitment of trainees:**

A two-stage, open process was undertaken to recruit trainees. The first stage sought expressions of interest (EoI) from prospective applicants in government and academia. EoI's included preparing a short paper highlighting applicant's view of the current crisis, focusing on its impacts, underlying causes and a suggested pathway to powering inclusive growth.

Applicants were short-listed following an assessment of the EoI and an interview. The short-listed applicants were guided by a panel of mentors to further develop their chosen proposal as a paper to be presented at the facilitated workshop. The papers were backed up by a case study demonstrating research skills including gathering data, framing the problem within a theoretical setting, analysing data and drawing implications for public policy and business management or community practice.

Participants for the workshop were confirmed based on the progress made within four weeks after accepting the initial proposal. The focus was to engage middle level officers in national policy planning and implementation, as well as progressive researchers contributing to public policies.

### **Undertaking the workshop:**

The workshop was coordinated by a panel composed of:

- a) Prof Clevo Wilson Queensland University of Technology, and former Editor-in-Chief Economic Analysis and Policy. Clevo has been a mentor for numerous PhD

- students and early career professional from South Asia and has a thorough understanding of capacity building issues.
- b) Dr Rajendra Adhikari, UQ Academic and ACIAR Agribusiness Research Project Leader, Pakistan pulses value chains; former Additional Secretary, Ministry of Agriculture, Nepal.
  - c) Dr Thilak Mallawaarachchi, UQ and Managing Partner Mallawa Insights Australia. Thilak is the President of AARES.
  - d) Dr Dil Bahadur Rahut led the ADBI contribution, including liaison with ADB, senior policy professionals and coordinated the activity as a co-leader with Clevo Wilson and Thilak Mallawaarachchi.
  - e) Prof Shunsuke Managi, Distinguished Professor of Technology and Policy & Director of Urban Institute at the Kyushu University, Japan (Director for Inclusive Wealth Report (IWR))
  - f) Dr Uttam Khanal, Nepalese researcher in climate adaptation and currently with the Productivity Commission – engaged as a resource person
  - g) Dr Todd Sanderson, ACIAR Research Program Manager, Social Systems coordinated the ACIAR, who contributed as a resource person.
  - h) Dr Pitchaya Sirivunnabood, Deputy Head/ Senior Economist, Capacity Building and Training, ADBI, coordinated the program development for ADBI, who contributed as a resource person.
  - i) ACIAR country managers in India Dr Pratibha Singh facilitated workshop arrangements and Dr Munawar Kazmi from Pakistan, who also contributed to regional liaison, attended the workshop in person and assisted with follow-up networking.

Development partners stationed in Kathmandu and from several CGIAR centres were also invited to a roundtable discussion as part of the training program. Senior policy advisors from the Nepalese government were also present. A group photo is shown in Fig 4.1.



Figure 4.1. The workshop participants, trainers together with HE Felicity Volk the Australian High Commissioner to Nepal and Dr Govinda Prasad Sharma (chief guest), Secretary Ministry of Agriculture and Livestock Development, Nepal at the start work the workshop.

The above stated attendance of a wide range of relevant experts was designed to demonstrate the value of seeking different perspectives in informing planning and prioritisation needs and in choosing appropriate interventions to address complex development issues that underpin crises and related capacity constraints. The workshop thus introduced tools and capabilities to a select set of development planning professionals in South Asia. The course helped identify tangible parameters to benchmark advancements in agricultural productivity, a key sector in most South Asian economies. At the same time, the course was able to reinforce a culture of results-based programming, and objective analysis to support evidence-based policy processes for inclusive development. Interactions involved examples involving the assessment of trade-offs between economic and environmental objectives, scrutinising evidence as well as concerns on aspects such as returns on investment, risk management as crucial capabilities to develop and manage agricultural adaptation programs.

#### **Development of the position paper:**

Planning for the workshop included producing a position paper on the development context and opportunities in South Asia. The position paper included analysis and assessment of the prevailing development context and a discussion on policy-research capacity development needs and development challenges in South Asia. Its key focus was on opportunities for public policy enrichment and on effective inclusive development with a focus on climate adaptation. This sub activity was led by the Sri Lanka Institute of Policy Studies (IPS).

#### **Compiling and editing the book**

Following the conclusion of the regional workshop, the project team has engaged with a leading academic publisher to seek publication of an international academic quality book. The book will include papers developed by participants and resource persons and lessons learned in deliberations with development partners. As such it will provide a valuable source for development learning and practice.

The book will illustrate the process of identifying a development priority in a local context and the tools and techniques used in the process of analysing options, identifying priorities, and assessing implementation challenges. It will highlight regional development opportunities and policy and practice change from an inclusive development and climate adaptation context.

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## 5 Methodology

The research approach to planning and undertaking policy development draws on deliberative planning methods in development administration and institutional strengthening. The course development therefore drew on OECD guidelines on deliberative processes for public decision making (<https://www.oecd.org/governance/innovative-citizen-participation/>) and on Australian experience in natural resource management and climate adaptation planning.

Discussion at the workshop drew on many country experiences including that of Sri Lanka in terms of issues relating to governance and accountability, macroeconomic vulnerabilities, and the preparedness for external shocks such as COVID-19 and commodity market volatilities and geopolitical tensions (Weerakoon et al., 2019). Also discussed were factors that influence microeconomic performance, linked to the nature of political economy imperatives, namely agency of people and their capacity and willingness to participate in the determination of their well-being (Petesch et al. 2022). For instance, answers were sought to questions such as 'What leads politicians to irrational exuberance?' which lies within the scope of agency, in particular the lack of it and which has created a high-level of welfare dependency.

The modern theory and practice of public administration places the citizen at the centre of policymakers' considerations, not just as target, but also as agent. The aim then is to develop policies and design services that respond to individuals' needs and are relevant to their circumstances and are hence growth and welfare promoting. Concepts such as 'co-creation' and 'co-production' have emerged as concepts that describe such systematic pursuit of sustained collaboration between government agencies, non-government organisations, communities and individual citizens (Holmes, 2011). There is greater scope to articulate these principles into administrative practice in emerging economies and enrich development practice for greater effect. While there are commonalities in the region, this is more so in Sri Lanka which is recognised for its rapid development progress — as shown by various development indicators. However, recent underperformance on growth is weakening the very foundation on which growth depends (Weerakoon et al. 2019).

Equally, a growing body of literature points to opportunities for realigning development efforts from a focus on poverty to building capabilities and self-reliance and a need to address push factors of deprivation and dislocation (McMichael and Weber 2022). These issues are inextricably linked. Thus to reveal what exposed Sri Lanka to its current economic dilemma, it is important to relate to the regional and international context. Remedying the Sri Lanka crisis, and similar exposures in the region, must involve foreign capital transfers in one way or another. Development is no longer about the issues of the past but managing the future (McMichael 2022).

This project therefore took the opportunity to bring together a group of scholars, policy analysts and development practitioners from the region to explore pertinent issues relating to aid absorption and capability gaps that constrain aid utilisation and examine guidance for development practitioners on directions for further work (Lin and Wang 2017). The deliberation were targeted to answer some questions around realigning sustainable economic development – in ways that enhance local comparative advantage and supporting effective social organisation – while acknowledging the nature of existing social foundation in which the development effort is rendered to achieve the desired social and economic well-being (United Nations 2020).

## 6 Achievements against activities and outputs/milestones

**Objective 1: To conduct a regional workshop, targeting skills and capability building of a group of middle level professionals in development practice, aiming to enhance mediating and influencing skills through policy analysis, design and communication impact**

no.	activity	outputs/ milestones	completion date	Comments
1.1	Workshop: Climate adaptation and inclusive development in the agricultural sector for South Asia	A four-day in-person training workshop with facilitators, mentors and trainers for policy-research papers development and policy design exercises. The workshop was held in Kathmandu, Nepal during 12-15 June, 2023. 15 trainees from six (6) South Asian countries attended the workshop and presented papers together with the trainers and resource people.	15 June, 2023, Kathmandu, Nepal	<p>The 16 trainees were middle level professionals skilled in development practice and chosen from six targeted South Asian countries, namely Bangladesh, Bhutan, India, Pakistan, Nepal, and Sri Lanka. The workshop was coordinated by a panel involving the following:</p> <ul style="list-style-type: none"> <li>a) Prof Clevo Wilson, Queensland University of Technology</li> <li>b) Dr Thilak Mallawaarachchi, Mallowa Insights and University of Queensland</li> <li>c) Dr Dil Bahadur Rahut, Asian Development Bank Institute (ADB), Japan</li> <li>d) Prof Shunsuke Managi, Distinguished Professor of Technology and Policy &amp; Director of Urban Institute at the Kyushu University, Japan</li> <li>e) Dr Rajendra Adhikari, University of Queensland</li> <li>f) Dr Todd Sanderson, ACIAR</li> <li>g) Dr Pitchaya Sirivunnabood, ADB</li> <li>h) Dr Pratibha Singh (India) and Dr Munawar Kazmi (Pakistan), ACIAR country managers</li> </ul> <p>Two trainees originally selected could not participate due to contingencies.</p>

1.2	Workshop: Climate adaptation and inclusive development in the agricultural sector for South Asia - <b>Roundtable with development partners:</b>	The workshop on day 4 was dedicated to a roundtable discussion with development partners. The three main themes were: a) Agricultural transformation: becoming more creative, adaptable, and collaborative b) Agricultural transformation: becoming more creative, adaptable, and collaborative – follow-up discussion from the roundtable with developing partners c) Towards a blueprint for a rewarding agricultural sector: A way forward.	15, June, 2023, Kathmandu, Nepal	The roundtable development partners involved were: Uma Singh, South Asia Advisor for Research and Partnerships of International Rice Research Institute, India o Peter Craufurd, Senior Scientist, Leader and Country Representative for Nepal, Cereal Systems Initiative for South Asia, Nepal o Dyutiman Choudhary, Senior Scientist and Project Lead, Nepal Seed and Fertilizer, Nepal o Manohara Khadka, Country Representative – Nepal, International Water Management Institute, Nepal. The panel discussion was joined by: Todd Sanderson, Research Program Manager, ACIAR, Australia Dil Rahut, Vice-Chair of Research and Senior Research Fellow, ADBI Pitchaya Sirivunnabood, Deputy Head of Capacity Building and Training and Senior Economist, ADBI Shunsuke Managi, Distinguished Professor, Kyushu University, Japan Thilak Mallawaarachchi, Associate Professor, University of Queensland, Australia Clevo Wilson, Professor, Queensland University of Technology, Australia
1.3	Workshop field trip for all participants	Field visit – Cultural and social fabric of South Asia	16, June 2023, Kathmandu, Nepal	Showcasing cultural diversity, endowments, and successful initiatives for building resilience in the agricultural sector. Two agricultural research stations were visited during this field trip which included two field talks delivered by two senior scientists from Nepal.
	Workshop: Climate adaptation and inclusive development in the agricultural sector for South Asia -	Co-hosting the workshop with the Asian Development Bank Institute (ADBI) with financial support and scientist participation	12-15 June 2023, Kathmandu, Nepal	ADBI covered trainee attendance, venue and related costs and expenses for attendees. ACIAR funds were used for participation and research costs of facilitators and trainers from Australia.

PC = partner country, A = Australia



**Objective 2: To develop a position paper to analyse and assess the prevailing development context and identify policy-research capacity development needs for South Asia**

no.	activity	outputs/ milestones	completion date	comments
2.1	Draft Position Paper	Position paper by Institute of Policy Studies as a discussion paper and presented at the Kathmandu, Nepal workshop	30 May 2023 and presented on 12 June, at the Kathmandu workshop.	First draft completed and presented at the Kathmandu workshop. The paper was presented at the workshop by Manoj Thibbotuwawa, Research fellow, Institute of Policy Studies, Sri Lanka. This was followed by a question and answer session.
2.2	Final Position Paper	Final position paper by Institute of Policy Studies completed. See Appendix 1.	30, August, 2023	The paper was completed based on learnings and comments received at the Kathmandu workshop. The authors of the paper are: Manoj Thibbotuwawa, Institute of Policy Studies, Sri Lanka Asanka Wijesinghe, Institute of Policy Studies, Sri Lanka Bilesha Weeraratne, Institute of Policy Studies, Sri Lanka Nisha Arunatilake, Institute of Policy Studies, Sri Lanka Thilak Mallawaarachchi, University of Queensland, Australia Clevo Wilson, Queensland University of Technology, Australia

PC = partner country, A = Australia

**Objective 3: Assemble course material, papers developed and lessons learnt during activity planning and workshop deliberations into a published resource book.**

no.	activity	outputs/ milestones	completion date	comments
3.1	Publishing a resource book	Have submitted a proposal to Springer. More details currently being provided to the publisher for approval. The book will consist of 25 chapters.	2024	The book will draw on the June regional workshop and research outputs including, situation analysis, policy issues and deliberations, case studies of policy interventions and lessons learned.

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## 7 Key results and discussion

This research and training activity was undertaken to examine key impediments to effective policy development and lay a foundation for building capacity in the policy-research interface for agricultural and rural economic transformation in South Asia. The project recognised the central role of planning for climate adaptation in catalysing inclusive development. It examined constraints to engaging youth in development practices and motivating emerging leaders in South Asia to play a catalytic role in realigning development strategies to meet new challenges. The regional workshop and associated field trip, attended by a select group of development practitioners in their early to mid-careers provided a forum to present their research and views for discussion with a more senior cohort to draw strengths and identify areas needing ongoing development to enhance their capabilities and empower their roles in influencing better decisions. The role of policy analysis, mechanism design and impact communication in mediating conflicts and influencing decisions in inclusive, participatory, and evidence-driven processes were highlighted using examples from emerging and advanced economy settings.

The workshop presentations addressed how South Asia, with its increasing population including a large youth cohort, has become one of the world's most challenging regions for enhancing social well-being in the emerging development context. Disruptions during the Covid-19 pandemic, Russia's war in Ukraine, widespread effects of climate change and market failures are making the region one of the most vulnerable globally. This is because the region's socio-economic advancement is closely tied to agricultural and rural development. The workshop considered factors that define the critical role of agriculture in the economies of the South Asian nations, the poverty-productivity links within agriculture and therefore the growing insecurity facing rural communities as climate change, resource degradation and trade disruption enhance the inherent risks associated with agricultural production.

Given estimates that climate change will reduce agricultural output by up to 10-12% by 2050 and severely affect water supply and its timely availability, there was a clear recognition by participants of the urgency in developing integrated policies to address risks associated with unsustainable water management, where impacts will cut across both rural and urban populations.

The presentations identified several critical factors with negative impacts on agricultural output, which, if not addressed in a timely manner, would further magnify the emerging climate change impacts. They included:

- The need to critically reassess the appropriateness of green revolution-led technologies that promote intensive use of agricultural inputs, making agricultural production economically challenging, socially disruptive, and environmentally damaging.
- Linked to the above, the excessive use of irrigation and indiscriminate use of fertilisers and agrochemicals, that compromises the intended benefits of new improved high yielding varieties and hence posing considerable sustainability risks owing to declining productivity, resource degradation and food safety risks.
- An explicit focus on safeguarding natural and human capital – including biodiversity, soil health, and farmers' health and safety - was noted as a key priority.
- The high level of poverty and consumption insecurity of South Asian farmers making them unprepared for meeting challenges imposed by:
  1. climate change
  2. resource degradation
  3. ageing rural population
  4. outward migration
  5. changing consumer preferences for clean and green farm outputs in importing countries

Discussions emphasised the need to build capacity for farming communities to embrace food safety and environmental compliance in all stages of production and the need for increasing awareness about safe agricultural practices in meeting food safety and nutritional requirements in both domestic and international markets. Opportunities to reduce food loss and enhance food safety and environmental health through improvements in agricultural practices, handling and service delivery across the supply chain were noted as pathways to modernise South Asian agriculture. Benefits were identified as accruing to both producers and consumers – including in developed nations where much of the exports sourced from these farming communities are exported.

Considering the urgency in tailoring policies to proactively meet the effects of climate change, the workshop identified several measures that could facilitate effective adaptations to climate change and minimise resource degradation. These included:

- information for farmers to improve timing and site selection for crop planting in relation to changing climate and exposure patterns.
- enhancing traceability of food supplies and service facilities for soil and leaf sampling and chemical residue analysis
- gradual removal of distortionary input subsidies on water and fertilizer
- measures to promote improved plant nutrition, soil and water management.

Preventing serious health hazards such as CKDu which is becoming endemic in agricultural regions that are intensively farmed was noted as an example of complex unintended consequences of ignoring integrated soil and plant nutrition that were once key components of traditional farming systems.

Gradual replacement of unsustainable new improved varieties in favour of high nutrition varieties of seed grains drawn from indigenous gene pools under locally consistent management regimes were noted as complementary strategies to address dependencies created in international trade in agricultural inputs and to address both carbon neutrality and biodiversity restoration objectives favoured by the youth and emerging generations.

Several presentations and subsequent discussions raised the issue of whether there was a need for more fundamental change to agricultural production in South Asia in view of the multiple challenges it faced. This included the need to reassess the sustainability targets — of which there were 169 — to be more practical and effective in addressing poverty and inequality.

Areas of concern that require immediate policy focus and development partner support for realignment of priorities included the following:

- a) declining farm size in South Asia as an overarching barrier to increasing productivity and output. Need to reform legislative and institutional restrictions, politically motivated subsidies and barriers to land market development that perpetuate conservative attitudes to land ownership amongst rural inhabitants.
- b) Subsidies were identified as providing perverse financial incentives to farmers that 'lock-in' unsustainable practices that harm farmers' own health, their natural resource base, and the well-being of farmers and that of the broader community.
- c) In this respect it was agreed that national planning efforts need to move away from the prevailing production focus that helped input suppliers, and instead safeguard consumption diversity as a mechanism to improve sustainable consumption. This would increase broader economy wide benefits, improve efficient allocation of scarce resources, and enhance stability and resilience.
- d) The need to change and adapt to an ageing rural population, outward migration and labour shortages, all of which increases the social dependency burden on young people,
- e) In view of addressing the above, exploring the merits of a universal basic income scheme that can provide blanket support to all vulnerable people, rather than a select

segment. There was agreement this was an area which needed further exploration to further to improve existing safety nets that are poorly targeted, proven ineffective and open for political manipulation.

- f) Diminishing trust, across communities which was affecting both social participation as well as motivation of the youth in all spheres of society. Prospects for developing networks of value creation, as alternatives to failed cooperatives, was noted as a pathway that can utilise emerging digital tools, including e-commerce in addressing market risks, raising productivity and the value of output to both producers and consumers.
- g) Barriers to participation of women. This was seen as an area of serious deprivation across South Asia, and therefore needed careful consideration to allow productive livelihood opportunities for women as well as to better recognise women's contribution to overall economic and social development in this region over many centuries.
- h) The ongoing challenge of rebuilding rural leadership development mechanism that were embedded in traditional cultures, to override prevailing social restrictions that erode trust and embellish behaviours that engender discrimination.

**Rural transformation and modernisation:** Overall, the challenge of rural transformation and modernisation of agriculture remains a key priority in South Asia. Preparing South Asian economies for meeting serious threats to livelihoods from the triple challenges of declining agricultural productivity, degradation of the natural environment including agriculture and intensification of climate change is necessary to avoid exacerbating the existing constraints that hold back agriculture's contribution to overall economic prosperity of South Asia.

**Food system resilience** is an overarching safety net that is widely called for by the youth who will bear the costs of the past inadequacies in development strategies. If the services that purport to support the food system were to enhance the risk to future productivity, it would diminish welfare and erode pathways to sustainability. Much of the current efforts compromise food system resilience.

**Targeting investments:** Given the severe impacts on the poor and vulnerable such developments bring, development partners working in the region have both an investment opportunity as well as a moral obligation to reconsider the development focus to be more consistent with the changing natural resource base and the environmental and political realities of South Asia.

In that respect the participants greatly appreciated the opportunity provided by the PRIME workshop and the Asian Development Bank Institute (ADBI) and the Australian Centre for International Agricultural Research (ACIAR), which made the implementation of this capacity building project possible.

The success of this activity points to further opportunities to replicate such events in the Pacific and East Asia developing economy regions for gaining similar insights that could inform development corporation across this emerging region of significant influence.

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## 8 Impacts

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### 8.1 Scientific impacts – now and in 5 years

The project has produced three important outcomes. The workshop produced 32 presentations and a roundtable discussion during a four-day period involving a group of middle level professionals in development practice from six South Asian countries currently working in the South Asian region. The presentations were backed by the workshop facilitators and trainers from Australia (Queensland University of Technology; The University of Queensland; Productivity Commission, Australia) and Japan (ADB and Kyushu University) with their own presentations. The roundtable conference participants were drawn from CGIAR: the International Rice Research Institute (IRRI), India; CIMMYT's Cereal Systems Initiative for South Asia (CSISA), Nepal; CIMMYT's Nepal Seed and Fertilizer (NSAF) project, Nepal; and International Water Management Institute (IWMI), Nepal.

The papers presented are shown below and placed under theme of session followed by the title of the paper and the speakers name, title and affiliation.

#### **Positioning**

*Positioning paper by IPS: South Asia's current context* - Manoj Thibbotuwawa, Research Fellow, Institute of Policy Studies, Sri Lanka

*SDGs and their achievement in South Asia* - Dil Rahut, Vice-Chair of Research and Senior Research Fellow, ADBI

#### **Theme 1: Issues in policy planning and implementation**

*Australian and global experience* - Thilak Mallawaarachchi, Associate Professor University of Queensland and Managing Partner, Mallowa Insights, Australia

#### **Theme 2: Agriculture and the rural economy in South Asia – current context and emerging challenges**

*Background to South Asian agriculture and the agricultural trilemma: low productivity, resource degradation and deprivation* - Clevo Wilson, Professor, Queensland University of Technology, Australia

Challenges in rural transformation and meeting quality of life aspirations - Raja Timilsina, Researcher, ADBI; Dil B Rahut, Vice-Chair of Research and Senior Research Fellow, ADBI; Thilak Mallawaarachchi, Associate Professor University of Queensland and Managing Partner, Mallowa Insights, Australia

Agricultural pricing policies public paddy e-procurement in Bangladesh - Taznoore Samina Khanam, Post-Doctoral Fellow, Agricultural and Rural Development Division, Bangladesh Institute of Development Studies, Bangladesh

#### **Theme 3: Wealth, inclusive growth, and sustainability: Prospects in South Asia**

Natural capital - Shunsuke Managi, Distinguished Professor, Kyushu University, Japan

#### **Theme 4: Threats and challenges to agriculture and rural well-being – emerging evidence.**

Impact of climate change and induced disasters on inclusive development in Sri Lanka's agricultural sector: implications and strategies for adaptation - Sajeevani Weerasekara, Deputy Director, Central Bank of Sri Lanka, Sri Lanka

Challenges and opportunities for food security in coming decades - Dil Rahut, Vice-Chair of Research and Senior Research Fellow, ADBI

Agriculture sector: inclusive and accelerated growth in Bhutan - Rinzin Dema, Associate Lecturer, Social Science, Sherubtse College, Royal University of Bhutan, Bhutan

#### **Theme 4.1: Threats and challenges to agriculture: concerns for raising rural well-being**

Enhancing climate resilience through GIS: application of geospatial technology for vulnerability risk assessment - Hafsa Aeman, Senior Research Officer, Geoinformatics, Digital Innovation and Technology, International Water Management Institute, Pakistan

Resource use trade-offs: the nexus between environmental vulnerability and agricultural production in a developing mountainous economy - Nirash Pajja, Lecturer, Quest International College, affiliated with Pokhara University, Nepal

Health, nutritional and social impacts of current agricultural practices and trade - Asanka Wijesinghe, Research Fellow, Institute of Policy Studies, Sri Lanka

Food loss and waste mitigation: a low hanging fruit or a steep challenge? - Manoj Thibbotuwawa, Research Fellow, Institute of Policy Studies, Sri Lanka; Thilak Mallawaarachchi, Associate Professor University of Queensland, and Managing Partner Mallawa Insights, Australia

#### **Theme 5.1: Policy environment influencing South Asian agriculture and living standards**

Macroeconomy and the global context - Pulak Mishra, Professor, Indian Institute of Technology, Kharagpur, India

Land use and water management - Thilak Mallawaarachchi, Associate Professor University of Queensland and Managing Partner Mallawa Insights, Australia

Policies to enhance productivity and efficiency in the agricultural sector- Sri Lanka - Sajeevani Weerasekara, Deputy Director, Central Bank of Sri Lanka, Sri Lanka

#### **Theme 5.2: Policy environment influencing South Asian agriculture and living standards**

Caring for unpriced rural resources - Clevo Wilson, Professor, Queensland University of Technology, Australia

Internalizing cost of occupational toxic exposures in agriculture: policy interventions and their implications for food security - Ajantha Kalyanaratne, Senior Lecturer, University of Sri Jayawardenepura, Sri Lanka (pre-recording)

Nurturing skills in adapting to ageing rural population, migration, and labour shortages - Uttam Khanal, Research Economist, Australian Productivity Commission, Australia

#### **Theme 6.1: Streamlining climate adaptation in agricultural development for better outcomes**

Building resilience and avoiding FCV - fragility, conflict, and violence - Thilak Mallawaarachchi, Associate Professor University of Queensland, and Managing Partner Mallawa Insights, Australia

Role of the state in uplifting agricultural productivity and rural living - Saliya Bandara, Senior Assistant Director (Development), Ministry of Power and Energy

Diversifying agriculture and off-farm income opportunities in profitable agribusiness - Muhammad Asif Kamran, Professor, University of Agriculture Faisalabad], Pakistan

#### **Theme 6.2: Streamlining climate adaptation in agricultural development for better outcomes**

Mitigating climate change and productivity impacts: the role of local varieties and traditional knowledge - Deepak Upadhyaya, Agricultural Economist, Nepal

Improving marketing and trade: pathways for promoting inclusive and sustainable agricultural growth through smallholders' collectives - Bidur Paria, Assistant Professor of Economics, Christ (Deemed to be University), India

Aligning priorities for inclusive growth, managing conflicts and trade-offs in policy design, using incentives for better outcomes: what happens to livelihoods when agricultural challenges are not addressed - Thilak Mallawaarachchi, Associate Professor University of Queensland, and Managing Partner, Mallawa Insights, Australia

### **Theme 6.3: Streamlining climate adaptation in agricultural development for better outcomes**

Climate adaptation experiences from South Asia: success stories in improving living standards and creating opportunities in the rural space - Uttam Khanal, Research Economist, Australian Productivity Commission, Australia

Empowering rural women and youth engagement for rural leadership - Hafsa Aeman, Senior Research Officer Geoinformatics, Digital Innovation and Technology, International Water Management Institute, Pakistan

Adaptation to climate change through sustainable water management: A case study from arid zone of Rajasthan, India - Dheeraj Singh, Principal scientist and Head, Krishi Vigyan Kendra, Central Arid Zone Research institute, India

Streamlining climate adaptation in agricultural development for better outcomes - climate adaptation planning – integrating scientific, economic, and social viewpoints - Nilmini Jayalath, Senior Research Officer, Agricultural Economics and Agribusiness Management Division, Coconut Research Institute of Sri Lanka, Sri Lanka

Designing social safety nets for consumption security: insights from Sri Lanka - Saliya Bandara, Senior Assistant Secretary (Development), Ministry of Power and Energy, Sri Lanka

Prospects for integration of carbon and biodiversity credits: an Australian case study review - Jeremy Webb, Researcher, Queensland University of Technology, Australia

The above presentations were followed by a roundtable discussion with development partners under two main headings:

### **Agricultural transformation: becoming more creative, adaptable, and collaborative**

#### **Towards a blueprint for a rewarding agricultural sector: a way forward**

The development partners who took part in the discussions were:

Uma Singh, South Asia Advisor for Research and Partnerships of International Rice Research Institute (IRRI), India

Peter Craufurd, Senior Scientist, Leader and Country Representative for Nepal, CIMMYT's Cereal Systems Initiative for South Asia (CSISA), Nepal.

Dyutiman Choudhary, Senior Scientist and Project Lead, CIMMYT's Nepal Seed and Fertilizer (NSAF) project, Nepal

Manohara Khadka, Country Representative, CIMMYT's International Water Management Institute (IWMI), Nepal.

#### **The panel discussion topics included:**

Highlighting foundational and specific economic policies: what changes can be undertaken, skills gaps and resourcing challenges.

- From supply focus to drivers of aggregate demand in the growth process
- Developing a collaborative entrepreneur
- Adapting to climate and social change

- Adopting technology and innovative tools in agricultural

The above discussions were followed by further specialist discussions. They were:

Leveraging green economy opportunities: green financing and cost-sharing collaborations - Shunsuke Managi, Distinguished Professor, Kyushu University, Japan.

Research priorities for development in the agriculture and rural economy interface - Uma Singh, South Asia Advisor for Research and Partnerships of International Rice Research Institute, India.

Todd Sanderson, Research Program Manager, ACIAR, Australia.

Peter Craufurd, Senior Scientist, Leader and Country Representative for Nepal, CIMMYT's Cereal Systems Initiative for South Asia (CSISA), Nepal.

Thilak Mallawaarachchi, Associate Professor, University of Queensland, and Managing Partner Mallawa Insights, Australia.

Clevo Wilson, Professor, Queensland University of Technology, Australia; Dyutiman Choudhary, Senior Scientist and Project Lead, Nepal Seed and Fertilizer, Nepal.

The workshop was followed by a field trip which consisted of visits to:

- a) Patan Durbar Square in Lalitpur which is a UNESCO World Heritage site (Fig: 8.1). More details of this site can be found at: [https://en.wikipedia.org/wiki/Patan\\_Durbar\\_Square](https://en.wikipedia.org/wiki/Patan_Durbar_Square)



Figure 8.1. A cross section of the workshop participants during their visit to Patan Durbar Square.



- b) Vegetable Crop Development Center (Fig 8.2 & Fig 8.3). The centre is located in Khumaltar which comes under the Ministry of Agriculture and Livestock Development, Nepal produces improved seeds varieties, undertakes germplasm conservation and provides technical services and support to farmers engaged in vegetable and vegetable seed production (Fig 8.2).



Figure 8.2. A scientist explaining the work being conducted at the Vegetable Crop Development Center.

After a brief presentation by Dinesh Prasad Sapkota about the activities of the Center the workshop participants were shown around the farm demonstration plots involved with increasing the yields of Nepalese farmers (Fig 8.3). More details about the research center can be found at: <https://sunspace.farm/vegetable-crop-development-center/>



Fig 8.3. Another view of the important work being carried at the Vegetable Crop Development Center. Participants of the workshop are seen examining the various trial plots at the center.

- c) The third place visited during the field trip was the ICIMOD Living Mountain Lab in Godavari (Fig 8.4). The lab provides space for sustainable farming practices to be demonstrated and where farmers whose work with them can be trained and the lab acts as a repository for plant germplasm resources. The workshop participants after a brief presentation by Yona Khaling Rai (Lab Associate) was given a tour of the Living Mountain Lab to showcase its sustainable agricultural practices in the field. For more details about the Lab see: <https://www.icimod.org/living-mountain-lab/>



Figure 8.4. Yona Khaling Rai (Lab Associate) explaining the work being undertaken at the Living Mountain Lab.

The second important impact of this project was the completion of the position paper entitled “*Development context and policy challenges for South Asia’s agricultural sector*”. This paper examines the evolution of South Asia’s agricultural sector with particular emphasis on its changing relative importance to GDP, emerging impediments to boosting productivity, and progress toward sustainability, while considering broader global environmental concerns. It then assesses the role of agriculture in South Asia’s growth and structural adjustment process. The paper outlines key policy areas and capacity-building requirements to accelerate sustainable growth of the agricultural sector in South Asia and highlights the policy challenges facing South Asian agriculture. This will be a useful addition to researchers on this topic in the region. Please see Appendix 1 for the full report.

The third important outcome is the steps being currently undertaken to publish a resource book based on papers developed and lessons learnt during activity planning and workshop deliberations. It is hoped that this book will act as a primer to researchers, policy decision-makers and students alike.

## 8.2 Capacity impacts – now and in 5 years

One of the main objectives of the workshop has been to facilitate the training of a group consisting of 16 middle level professionals in development practices from six South Asian countries currently working in the South Asian region by a group of facilitators from Australia (Queensland University of Technology; The University of Queensland; Productivity Commission, Australia) and Japan (ADB and Kyushu University). In addition, the trainees were able to take part in the roundtable discussion with development partners from the International Rice Research Institute (IRRI), India; CIMMYT’s Cereal Systems Initiative for South Asia (CSISA), Nepal; CIMMYT’s Nepal Seed and Fertilizer (NSAF) project, Nepal; International Water Management Institute (IWMI), Nepal.

The workshop brought together trainees, facilitators, development partners and participants from the following organisations:

Australian Centre for International Agricultural Research (ACIAR); Asian Development Bank Institute (ADBI); Australian Productivity Commission, Australia; Queensland University of Technology, Australia; The University of Queensland, Australia; Kyushu University, Japan; Sherubtse College, Royal University of Bhutan, Bhutan; Bangladesh Institute of Development Studies, Bangladesh; International Water Management Institute, Pakistan; University of Agriculture Faisalabad, Pakistan; Quest International College, affiliated with Pokhara University, Nepal; CIMMYT's Cereal Systems Initiative for South Asia (CSISA), Nepal; International Water Management Institute (IWMI), Nepal; CIMMYT's Nepal Seed and Fertilizer (NSAF) project, Nepal; International Rice Research Institute (IRRI), India; Indian Institute of Technology, Kharagpur, India; Christ (Deemed to be University), India; Indian Institute of Technology, Kharagpur, India; Central Arid Zone Research Institute, India; Institute of Policy Studies, Sri Lanka; Central Bank of Sri Lanka; University of Sri Jayawardenepura, Sri Lanka; Coconut Research Institute of Sri Lanka, Sri Lanka Ministry of Power and Energy, Sri Lanka.

Chief Guest: Govinda Prasad Sharma, Secretary Minister of Agriculture and Livestock Development, Nepal;

Special Remarks: Her Excellency Felicity Volk, Australia's Ambassador to Nepal

Pre-dinner speech: Nilusha Dilmini, Charge de Affairs, Sri Lanka Embassy.

The workshop also brought together Dr Kazmi Munawar Raza, Country manager, ACIAR, Pakistan who described ACIAR projects in the region and progress in their development. In group discussions that followed there were presentations by both trainees and facilitators.

The workshop offered a foundation for understanding the policy-research interface and its development priorities and how future investments could be directed to address such priorities, including for climate adaptation and the broader issue of inclusive development.

Collaboration with ADBI enabled the sharing of experiences and understanding ways to enhance the effectiveness of goals in capacity building and priority setting for climate adaptation and inclusive development in South Asia. ADBI informs development priorities by highlighting new opportunities and bridging capacity constraints including in problem identification and knowledge dissemination within the Asian Development Bank member nations. More broadly, ADBI's activities drew on resource material from the World Bank, the OECD and other development partners, including the CGIAR system.

The book that will be produced as an ancillary output, will record contributions from participants in the workshop with course material to provide a resource for future development planning and priority setting.

Finally, the participants have also created a WhatsApp chatgroup dedicated to the PRIME workshop to enable the posting of regular updates about their current activities and projects they are involved in especially those that relate to the theme of the workshop.

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### **8.3 Community impacts – now and in 5 years**

The project has resulted in several community impacts through the dissemination of information. First and foremost, this involved the gathering of 30 participants at the workshop and the presentation of the work over a four-day period which was followed by a question and answer group discussion. This resulted in many issues being discussed openly with many lessons learnt and issues raised. The position paper developed in collaboration with the Institute of Policy Studies, Sri Lanka will result in new knowledge being provided to a network of researchers working particularly in the South Asian region and will further research into finding solutions to the pressing problems raised in the discussion paper. Likewise, the book that will result from the workshop will disseminate knowledge to a wide academic community

whose work in the region will influence policy decision making in relation to bringing about better outcomes for the large populations who are still tied to agriculture for their livelihoods.

### **8.3.1 Economic impacts**

There are no direct economic impacts resulting from the project. However, it should be mentioned here that the initial ACIAR funding project resulted in financial and in-kind support being provided by ABDI which covered the cost of trainee attendance, the venue costs, field visits and related expenses for 30 attendees. While ACIAR funds were used for participation and the research costs of facilitators and trainers from Australia and the honoraria for Prof Shunsuke Managi from Kyushu University, Japan. ADBI covered the costs of Prof Managi's attendance. It should be pointed out that if not for the financial and in-kind support from ADBI, it would not have been possible to invite the 16 trainees from six South Asian countries over a five day period. The success of this project points to further opportunities to replicate such events with ADBI co-funding in the Pacific and East Asia developing economy regions. By doing so the development of similar insights can usefully inform development corporation across this emerging region. Economic impacts will continue to flow from enhanced capacity of development professionals and other activities that will follow from this catalytic investment.

### **8.3.2 Social impacts**

There are no immediate social benefits stemming from the project. The social impacts of this project will require more time to become evident at the local level. There are several areas of concern identified which require an immediate policy focus and development partner support. Such areas which not only have economic but also social implications include the following:

- a) declining farm size in South Asia as an overarching barrier to increasing productivity and output.
- b) Subsidies providing perverse financial incentives to farmers that 'lock-in' unsustainable practices that harm farmers' own health, their natural resource base their overall well-being and that of the broader community.
- c) The need to move towards more efficient allocation of scarce resources and enhance stability and resilience.
- d) Recognising the need to change and adapt to an ageing rural population, outward migration and labour shortages, all of which increases the social dependency burden on young people.
- e) The merits of a universal basic income scheme that can provide blanket support to all vulnerable people, rather than a select segment.
- f) The noted diminishing trust across communities—a serious concern affecting both social participation as well as motivation of the youth in all spheres of society.
- g) Barriers to participation of women - an area of serious deprivation across South Asia
- h) Ways to rebuild rural leadership development mechanism that were embedded in traditional cultures, to override prevailing social restrictions that erode trust and embellish behaviours that engender discrimination.

### **8.3.3 Environmental impacts**

The title of the project was 'Policy-research interface mediation and enabling (PRIME) workshop: climate adaptation and inclusive development in the agricultural sector for South Asia'. Although, no immediate impacts are foreseen, a large number of presentations addressed issues relating to planning for climate change adaptation and to minimise its impacts on agriculture, resource degradation and related issues and how best to tackle these issues in the future. Given that climate change will reduce agricultural output and severely affect water supply and its timely availability, there was a clear recognition by participants of the urgency in developing integrated policies to address risks associated with unsustainable water management, where impacts will cut across both rural and urban populations.

The presentations identified several critical factors with negative impacts on agricultural output, which, if not addressed in a timely manner, would further magnify the emerging climate change impacts. They included:

- the need to critically reassess the appropriateness of green revolution-led technologies that promote intensive use of agricultural inputs, making agricultural production economically challenging, socially disruptive, and environmentally damaging.
- Linked to this is the excessive use of irrigation and indiscriminate use of fertilisers and agrochemicals and which compromises the intended benefits of new improved high yielding varieties and hence posing considerable sustainability risks owing to declining productivity, resource degradation and food safety risks.
- An explicit focus on safeguarding natural and human capital – including biodiversity, soil health and farmers' health and safety - was noted as a key priority.
- The high level of poverty and consumption insecurity of South Asian farmers making them unprepared for meeting challenges imposed by:
  - a) climate change
  - b) resource degradation
  - c) ageing rural population
  - d) outward migration
  - e) changing consumer preferences for clean and green farm outputs in importing countries

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## 8.4 Communication and dissemination activities

The project and key results of the joint workshop were given wide publicity by ACIAR and ADBI on the respective websites of these two institutions.

The ACIAR website provides an overview of the project, highlights the project activities and expected outcomes together with the key partners of the project. Full details of the project can be viewed on the ACIAR website:

<https://www.aciar.gov.au/project/sss-2023-104>

ADBI was a co-funder of the project which included the covering of the cost of trainee attendance. In order to recruit the trainees for the project workshop, ADBI conducted an online search for mid-career professionals whose work is related to agricultural development, climate change adaptation, and related fields. Eligible candidates in the South Asian region were encouraged to apply via a link provided before the 14<sup>th</sup> of April, two months prior to the scheduled workshop. The call for applications which is below was also circulated among the ADBI contacts in the South Asian region and diplomatic missions.

The call for papers can be accessed at:

<https://www.adb.org/adbi/research/call-for-policy-research-proposals-on-climate-adaptation-and-inclusive-development-in-south-asia-s-agricultural-sector>

This call for applications was followed by wide publicity provided by ADBI once the agenda of the workshop and biographies of the speakers were made available. The agenda, the biographies of the speakers, a summary of the workshop, its objectives and the workshop dates can be found at

<https://www.adb.org/news/events/the-workshop-aims-to-serve-as-a-foundation-for-building-capacity-in-the-policy-research-interface-for-agriculture-and-rural-economic-transformation-in-south-asia>

It is to be noted here that many of the participants' organisations also provided publicity to the workshop. The participants have also created a WhatsApp chatgroup that post regular updates about their activities and projects they are involved in.

In addition to the above, a summary of the workshop outcomes has been produced for ADBI which will be made available on its website in due course.

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## 9 Conclusions and recommendations

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### 9.1 Conclusions

This workshop and accompanying working papers have provided a timely opportunity to bring together a broad cross section of regional experts and mid level policy makers with the aim of identifying the key emerging issues facing the inclusive development of agriculture in South Asia at a time of accelerating climate change. A number of issues of overarching importance emerged from the workshop. They included:

1. The emerging limits of the green revolution in terms of biodiversity loss and the related negative externalities including excessive use of fertilisers
2. The structural transformation in South Asian countries has not ensured a contraction of the agricultural labour force on par with the contraction of the share of the agriculture sector in GDP. The low output and high labour force participation indicates the considerable scope for raising productivity within and outside the farm sector.
3. A key roadblock to increasing agricultural productivity and reducing the chronic poverty of South Asian farmers was identified as the persistence of small plot sizes in most South Asian countries.
4. The use of subsidies which support uneconomic farming activity and excessive use of fertilisers served to keep farmers in uneconomic activities.
5. The worrying degradation of water resources due to overuse by farmers where this scarce resource has been unpriced.
6. The magnitude of food losses which run at around 20% for South Asia - an issue which is described as low hanging fruit in terms of finding solutions.

Other speakers raised the possible use – and problems of trust involved in the use - of cooperatives to create more extensive cost-effective agriculture. The use of income insurance to alleviate rural poverty and to assist mobility between rural and non-rural sectors of the economy was also raised as a possible policy for governments wishing to accelerate structure change.

In summary the greatest concern centred around the fact that South Asia's agricultural sector was particularly vulnerable to climate change. The size of negative externalities emanating from the green revolution, the ageing of the farming workforce and the smallness of farming economic units meant that a forecast 10-12% decline in productivity by 2050 due to climate change was likely to lead to an unsustainable drop in farmer welfare.

However, to significantly raise agricultural productivity and welfare by structurally adjusting land size and ownership – including the elimination of subsidies - was seen as politically challenging for governments which typically drew strong electoral support from over representation of rural areas. Nor have governments so far been able to deliver a sufficiently developed manufacturing sector to absorb a shrinking of the rural population - nor accommodate them in an already employment saturated services sectors.

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### 9.2 Recommendations

Feedback from the mid-level policy maker participants indicated they were unaware of the full complexity of issues facing South Asian agriculture and the urgency with which they needed to be addressed. In particular, the workshop conveyed a sophisticated understanding of the



interlinkages between key issues - the sustainability of agriculture in a post green revolution environment, climate change, rural poverty and resource depletion – which are producing dynamic problematic change.

There is therefore a clear need for an ongoing progressive re-examination and re-development of policies to take into account these dynamics and for developing a means of passing this on to policy makers. Replicating training and policy development workshops in other South Asian, East Asia and the Pacific Island countries would therefore provide such an ongoing means.

The meshing of academics and policy makers in such workshops delivers a number of unique benefits. It provides a means for identifying talented mid-level decision makers who are incentivised through workshop participation to engaged in their own research relevant to their area of expertise and have this disseminated in policy making circles. The workshop format equally provides a means of initiating ongoing information exchange, research and policy development between academics and policy makers.

It is envisaged that a necessary component of such an ongoing workshop program is the publication of a book which would provide a working foundation for their organisation. That is, it would contain an outline of the aims and objectives of such joint workshops, provide the background to the issues surrounding agricultural development, climate change and inclusive development and the outcomes of the Kathmandu workshop. Such a booklet would include summaries of presentations by academics and mid-level policy makers at the Kathmandu workshop as a means of illustrating the inputs made to the workshop.

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Thibbotuwawa, M., et al. (2023). *Development Context and Policy Challenges for Agricultural Sector in South Asia: Background paper prepared for the Workshop "Development Context and Policy-research Capacity Development Needs in Climate Adaptation and Inclusive Development in South Asia"*, Institute of Policy Studies, Sri Lanka.

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## 11 Appendixes

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### 11.1 Appendix 1:

## Final report

# Development context and policy challenges for South Asia's agricultural sector

**Background paper prepared for the workshop in Kathmandu, 12-16, June, 2023 jointly sponsored by ACIAR and ABDI**

**SRA Project:** *Policy-Research Interface Mediation and Enabling (PRIME) Workshop: Climate*

*Adaptation and Inclusive Development in the Agricultural Sector for South Asia*

**SRA No:** SSS/2023/104

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## **Executive summary**

This paper examines the evolution of South Asia's agricultural sector with particular emphasis on its changing relative importance to GDP, emerging impediments to boosting productivity, and progress toward sustainability, all while considering broader global environmental concerns. It then assesses the role of agriculture in South Asia's growth and structural adjustment process. The paper outlines key policy areas and capacity-building requirements to accelerate sustainable growth of the agricultural sector in South Asia.

## **The Development Context**

Agriculture holds a pivotal position in South Asia, providing direct and indirect employment to over one billion people, which represents 60% of the region's population of 1.8 billion. South Asia was severely affected by the Covid-19 pandemic and global trade disruption due to the ongoing Russia-Ukraine war. The region's agricultural sector is highly vulnerable to climate change and adapting to climate change presents a significant regional challenge. This challenge is exacerbated by the region's heavy reliance on imported agricultural inputs and significant balance of payment difficulties related to debt-financed development activities that have failed to provide a basis for sustainable growth.

The evolution of South Asia's agriculture can be considered under four phases: (i) the capital transfer and infrastructure development-based plantation agriculture phase before the 1930s (ii) the land development and irrigation-based phase from the mid-1930s to 1950s (iii) the "green revolution" phase from mid-1960 till mid-1980s and (iv) the open market and export-oriented phase commencing in the late 1980s and continuing to the present in varying degrees.

The first phase occurred during the colonial occupation in much of South Asia and involved the expansion of plantation agriculture with significant capital transfer and infrastructure development. The neglect of the peasants' sector led to social distrust and consequent socialist policies for land allocation aiming to reduce rural poverty and inequality which paved the way for the second phase. During the second phase, irrigation projects were undertaken, and the developed lands were distributed among the landless, mainly for the production of rice and other cereals marking the beginning of an era of rapid land settlements.

The third phase centred on the well-documented adoption of high-yielding cereal crop varieties and increased use of fertilizers and pesticides coupled with further expansion of irrigation infrastructure. However, while increasing the overall production of rice and some field crops, this occurred with little diversification of food crop varieties. Also, of concern has been the slowing of productivity growth and sustainability issues flowing from inappropriate use of irrigation and agrochemicals that were promoted under state subsidies and narrow commercial interests.

During the fourth phase (the 1980s - present), countries in South Asia initiated market-oriented reforms such as attempts to liberalise agricultural markets, reduce government monopolies and encourage private sector participation, largely in response to economic crises and lender recommendations that highlighted a growing recognition of the limitations of state-controlled agriculture. These reforms have been aimed at increasing efficiency, attracting investment, and promoting exports.

Flowing from the green revolution, South Asia economies have substantially increased the production of staple agricultural commodities (Figure 13). The increase in output was around 3% annually between 1961 to 2021 (Figure 13). The increase in yields was no less dramatic. Wheat, maize, and rice yields in South Asia increased on average by 260%, 255%, and 172% over the same period (Figure 14).

This growth has contributed to a remarkable reduction in poverty (section 2.3), with the poverty headcount ratio falling from 38.6% to 8.6% between 2013 and 2019. However, South Asia still accounts for one in four people living in extreme poverty worldwide.

The relatively high incidence of poverty, accompanying high levels of malnutrition, waste and stunting among children, including within the agricultural sector, is of global concern. This adds to the future challenge of ensuring the sustainability of agriculture in the South Asian region, which is being made worse due to advancing climate change. South Asia is one of the most vulnerable regions to climate shocks experiencing intense heat waves, cyclones, droughts, and floods. The Global Climate Risk Index 2020 ranked India and Sri Lanka as the 5th and 6th most climate-risky countries in the world. More than half of all people in South Asian - 750 million - have been affected by one or more climate-related disasters in the last two decades.

The region's heavy reliance on rain-fed agriculture, mainly practiced by smallholder farmers, makes it particularly susceptible to shifting rainfall patterns. Land use systems are therefore being challenged by rising sea levels and floods, soil erosion and salinization, which are negatively impacting coastal and low-lying communities and associated agricultural land. A further key issue for South Asia and its extensive paddy cultivation is that the demand for water for irrigation often exceeds the available supply, leading to conflicts between different user groups under systems of inefficient water allocation that does not address scarcity.

Thus, the widespread excessive extraction of groundwater for irrigation purposes in South Asian countries reflects the equally widespread reluctance to place a price on water used for irrigation which therefore encourages unregulated pumping. Such problems feed through to the issue of food security in the South Asian region where it remains an issue of concern given the still significant proportion of its population living in poverty and strong regional differences in agricultural output and distribution.

Misdirected efforts to intensify the productivity of land in South Asia – including through excessive use of fertiliser and irrigation —as so heavily encouraged in the green

revolution— have resulted in unsustainable levels of land degradation including biodiversity loss, soil erosion, water depletion and pollution.

This singular emphasis on the growth of agricultural output in South Asian economies has substantially reduced their dependence on agriculture. Despite the decline in its contribution to GDP (from 44% of GDP in 1960 to 17% in 2021), agriculture remains a significant employer in South Asia (Figure 40). Currently, over 42% of the labour force in the region is employed in agriculture compared to over 62% in the early 1990s although this percentage is still well above the global average of 27%. Thus, the South Asian region is still one of the most labour-intensive agriculture areas in the world (FAO, 2022) and has one of the world's lowest levels of agricultural labour productivity. Thus, the contraction of the agricultural labour force has not been on par with the contraction of the share of the agriculture sector in GDP. That is, agriculture has retained an overly large share of employment, owing to a lack of opportunities elsewhere. Promoting non-farm employment opportunities for a growing well-educated labour force remains a high priority.

South Asia's agriculture, dominated by smallholdings (around 1-2 ha) makes mechanisation economically challenging. While some countries in Southeast Asia have begun to aggregate smallholdings to allow economies of scale, agrarian policies and local norms and values often prevent such amalgamations difficult in South Asia.

Covid-19 experience has shown that remunerative employment opportunities remain critical in addressing hunger, averting malnutrition, and easing associated risks to human capital development. Equally, the failure to develop a competitive industrial sector and the disproportional growth of the services sector in South Asian economies has impacted productivity growth, although it has helped absorb much of the labour force leaving the agriculture sector. Removing market distortions that hamper innovation and investment in the industrial sector and creating a viable agro-industrial sector is critical to increasing the share of GDP in tradable goods and services such as information technology services, to address growing debt-service problems at all levels, from households to governments.

It is also apparent that reduced agricultural tariffs, especially after 1995, have not generally led to the successful development of agricultural industries based on comparative advantage. Distortionary subsidies that erode the ability to capitalise on comparative advantage, the inability to invest in capacity to meet sanitary and phytosanitary measures and other trade-facilitating measures continues to hinder South Asia's agricultural and food exports to competitive markets in advanced economies.

It is therefore critical to improve policy settings and address capacity constraints for trade facilitation, including food standards and hygiene, handling and logistic systems to allow more rapid development of export agriculture. Lack of opportunities to gainfully employing educated labour much of which is currently transiting to a services sector



that can no longer productively accommodate such increasing numbers is hampering productivity growth.

Moreover, meeting substantive demands for reform of economic policies of South Asian governments and the complexity involved requires a talent pool capable of adapting research and development evidence from advanced economies to the local context, with appropriate adjustments to allow a smooth transition. However, the current agricultural research system is essentially government-controlled and lacks the flexibility or vision to facilitate a pathway to commercialisation of agriculture, promoting regional specialisation and vertical diversification taking advantage of domestic resource capabilities and knowledge systems.

## **Priorities**

Building the knowledge base and strengthening policy development capacity stands out as the key development intervention. Several policy priorities and research for development recommendations can be gleaned from the above analysis of the development context of Agriculture in South Asia.

***Agribusiness and Policy Capabilities:*** Prospects for raising agricultural productivity and transitioning to industrial economic growth lie in successfully integrating with the global trading system. Globally, evidence indicates that increasing integration even in agricultural and food value chains can create growth opportunities with spinoffs to industrialisation, including in the digital economy. Empirical evidence points to the importance of enabling trade policies for successful participation in Global Value Chains (GVCs) (Sections, 2.2 and 3.9). South Asia's GVC participation is already low, and the region's trade agreements (RTAs) have failed to boost GVC participation (see Box 4). Further research on the benefits of repealing long sensitive lists, that strategically put exporting country's products at a comparative advantage and removing regulatory barriers such as country of origin rules which could weaken the effectiveness of RTA's would be of value. Equally, investing in the capacity to undertake trade policy analysis, such as the reduction of quantitative trade restrictions, para-tariffs, and high tariffs on finished product imports which have characterised South Asian governments' trade-related policies could facilitate participation in global supply chains (Figure 4). Such work could identify country-specific adjustment strategies. Such policy analyses will also serve to reduce the protection of the agricultural sector and accelerate needed rationalisation.

In line with removing distortionary tariffs and non-tariff barriers, targeted studies on domestic land and agricultural marketing policies are needed. Such work can lead to knowledge that inspires institutional capacity development, investment in quality assurance and accreditation, and legal expertise in dispute settlement that are necessary to circumvent trade-related issues. Anecdotal evidence also suggests that poor on-farm practices are largely the source of difficulties in meeting quality and consistency requirements for food trade. Investment in research that address farm-

level impediments to agribusiness development and commercialisation opportunities for smallholder farming communities are of high priority to address embedded social justice and women participation constraints.

**Land and Water Management.** Reforming national land use policies that emerged during the colonial era and the post-war period to relax regulatory barriers for land use change, foster a transition from low-value to high-value agriculture and thereby raise agricultural productivity is a priority.

Policy reforms that strengthen incentives for sustainable agricultural practices, rationalising land ownership regulations, and strengthening the organisational and institutional framework for land management are equally important. Agricultural development responsibilities held by numerous scattered institutions could often duplicate responsibilities and waste scarce resources. Creating evidence to support reforms that can strengthen such institutional arrangements is lacking and various stakeholders fail to collaborate for want of clarity and fear of losing long-held advantages.

Equally, in the medium to long term agricultural productivity will depend to an important part on increasing the efficiency of land and water management and improving plant nutrition on small agricultural plots. Demonstrating the benefits of good agricultural practices in reducing risks to human health and nutrition, food safety, and environmental integrity remains a high priority for investment in R&D.

**Climate Adaptation.** Given the pressures created by climate change, declining land availability, and diminishing biodiversity, there is a clear need for farmers to accelerate the move towards resilient agricultural systems that integrate improved plant nutrition, integrated pest management, and responsible land management under increasing uncertainty of weather patterns that have guided traditional agriculture. Facilitating the uptake of new knowledge that allows systemwide adoption of appropriate technology such as that delivered by the internet (IoT), GPS, remote sensing and drones for various farming activities, including irrigation and tillage may help small farmers gain economies of scale in addressing collective water management and plant nutrition challenges. Such precision technologies can also facilitate a move away from the indiscriminate use of chemical fertilisers and pesticides. Research on the use of local varieties adapted to the local context could also offer high dividends.

Research indicates that the long-run solution to widespread irrigation externalities, equity, and cost recovery in service provision draws on suitable combinations of participatory management and use-based irrigation charges. Given the obvious political sensitivities of pricing water, care is needed to determine suitable institutional arrangements and implementation strategies. Determining the merits of such reform including the development of appropriate policy models linking different scales from farm to regions and national economy are beyond the capabilities of cash-strained governments faced with more immediate expenditure priorities and skill shortages.

These can be considered within development strategies for climate adaptation to minimize duplication of efforts and maximise effectiveness.

***Streamlining Agricultural Research and Development.*** Resource constraints are affecting much-needed research on enhancing agricultural productivity and linking agriculture to broader development priorities for livelihood improvement, rural transformation, and social integration. Also, adaptive research emerges as important in translating foreign technology to different locations in countries with differing resource constraints. Emphasis also needs to be given to promoting local resources—the utilization of unexploited indigenous genetic potential especially fruit; aquatic plants and medicinal herbs—and understanding the risks and rewards of controlled agriculture (greenhouse and poly-tunnel technology); water-saving crop production techniques (solar power drip irrigation) and non-seasonal crop production and small and medium scale agricultural machinery under evolving local constraints.

**Public-Private Partnerships.** Strengthening the role of public-private partnerships is also identified as a pressing need. Agricultural extension systems are under increasing pressure to become more effective, more responsive to clients, and less costly to governments. Further, the present extension system, which focuses on the production aspect needs to be restructured towards process and value chain approaches to improve competitiveness, strengthen business decision-making, and introduce diversification into processing and value addition. Research that demonstrates the effectiveness of cost-sharing mechanisms such as demand-driven, fee-levying extension systems that complement conventional systems, could encourage public-private partnerships and stimulate investment in IT technology infrastructure to enable easy and speedy access to information by all stakeholders.

South Asia's development context presents numerous opportunities for south-south cooperation as well as targeted interventions from advanced economies for capacity building and development of public infrastructure to facilitate rural transformation. In the absence of appropriate interventions, risks that are imminent across South Asia could amplify creating social deprivation and public unrest, with implications that can spill over to the rest of the world.

While the paper's analyses and recommendations offer valuable insights to facilitate discussions and foster development cooperation, further research and dialogue is essential before implementing investments or interventions.



## 1. Introduction

Agriculture is a key sector in most South Asian economies, where approximately 60% of the region's population of 1.8 billion people find direct or indirect employment (Khan & Imran, 2021). This is particularly so for India, Bangladesh, Pakistan, Afghanistan, Nepal, and Bhutan where much of the economic prosperity is derived from agriculture (Khan & Imran, 2021). Given the importance placed on agriculture within the region, its sustainability is essential to guarantee sufficiency in rural incomes and food security. South Asia which is currently being exposed to hunger and undernourishment is home to more than a quarter of the world's population and is likely to reach 2.68 billion by 2050 (Mohan, 2022)., The region's economy and agriculture in particular, was severely affected by the COVID-19 pandemic and the Ukraine-Russia war. Also, South Asia is highly vulnerable to climate change and its impacts: studies show that the region's crop production could decline by 10 - 15% by the end of the century due to the effects of global warming (Mohan, 2022).

Historically, South Asia countries have been dependent on imports for agricultural inputs. The green revolution of the 1960s was driven by a technology revolution, comprising a package of new technology and inputs –irrigation, improved high-yielding seeds, fertilizers and pesticides (Hazell, 2009). This increased agricultural productivity several-fold, although at the cost of greater dependence on imported inputs. Unlike previously, farmers could no longer grow their own seed and rely on local sources for plant nutrition and pest control. Farmers' retained profits continued to deplete as input costs rose. Despite the early success, in the post-green revolution period, investment in agriculture dropped off dramatically (Herdt, et al., 2007). The inability to cope with a cost-price squeeze in largely informal markets also meant that farmers lagged in their responses to improve agricultural productivity. All these enhanced the vulnerability of the agriculture sector to crises arising from shocks such as the COVID-19 pandemic and the Ukraine-Russia conflict that disrupted global trade and supply systems and drastically reduced the capacity of governments to play their part.

The COVID-19 pandemic has had numerous economic, social, and environmental impacts with far-reaching consequences for both the immediate and the long term (Thibbotuwawa, et al., 2021). With the onset of the crisis, most South Asian economies experienced negative growth rates. Thus, the region, which was the fastest-growing in the world in 2019, entered a slow-growth phase commencing in 2020 (Raihan, et al., 2020). Regional growth was projected to contract by 7.7% in 2020, according to the World Bank, owing to reduced private consumption. This projection signaled an increase in poverty in the coming years (World Bank, 2020) in light of rising food insecurity caused by the impacts of the economic lockdown. This was particularly true for Sri Lanka in the post-COVID-19 era due to extreme food inflation, limited access to imported food and diminished domestic food production.

The frequency of geo-political conflicts affecting the South Asia region has increased in the past decade. The ongoing Russian-Ukraine conflict exacerbated the situation in

the region by driving up prices of agricultural inputs and fuel, affecting the productivity of domestic agriculture, thereby limiting the supply of food and driving up prices further. It has had major implications for food security and global food systems given the important role of both Russia and Ukraine in global food, fertilizer, and energy trade. Russia and Ukraine together accounted for about 12% of global agricultural exports on a caloric basis and over 30% of global wheat exports (Glauber & Laborde, 2022). Fertilizer and energy markets experienced rising prices and supply disruptions as well. The impact of this shock has been compounded for countries that had already been exposed to external trade deficits and inadequate foreign reserves, such as Sri Lanka. Therefore, there is greater attention in development circles on the case of Sri Lanka to address precursors to such crises. (Thibbotuwawa, et al., 2023).

Another key factor affecting agricultural productivity is climate change. South Asia is particularly vulnerable to climate change due to its high population density, poverty and lack of resources for adaptation. Intergovernmental Panel on Climate Change (IPCC) projections indicate the possibility of above-average warming, increased monsoon rainfall and increased frequency of extreme precipitation events (Ahmed & Suphachalasai, 2014). Climate change impacts in the region are numerous and multifaceted with greater social, economic and environmental consequences. Therefore, there is an urgent need to better understand the policy environment surrounding the sustainability of agriculture in the South Asian region.

Agriculture is essentially about managing natural resources — land, water and genetic resources. Taking this into account, in other parts of the world, governments are helping farmers to advance their management capabilities through research and development that enable farm innovations which lead to greater resilience. The ability of countries in South Asia to support such research and development is limited by both research capacity and financial resources. Hence, they have largely relied upon adapting innovations from other contexts, often failing to take note of changing local comparative advantage. Traditionally, South Asian countries could rely on cheap labour for agriculture – a factor that led to colonial interests in establishing plantation agriculture. But, with development and growing opportunities for migration, children of traditional farmers are leaving their villages in search of better jobs in urban areas, both locally and overseas. This has created a labour shortage in rural agriculture. Developed countries have dealt with such issues by substituting capital for labour. However the structure of agriculture is dominated by smallholdings (around 1-2 Ha or smaller) and poor market settings in South Asia make mechanization economically challenging. While some countries in Southeast Asia have begun to aggregate smallholdings to allow economies of scale, agrarian policies and local norms and values often prevent such amalgamations in South Asia. This makes investment in machines not cost-effective. Governments therefore need to reassess land use and tenure policies and explore new ways to safeguard farmers' rights while allowing for economies of scale. Moreover, given a substantial proportion of the population in South Asia is directly or indirectly associated with agriculture for their livelihood, raising

sector productivity will mean a proportion will find opportunities elsewhere in the economy. Hence agricultural development cannot be considered in isolation - particularly in meeting challenges posed by climate change - which has the potential to disrupt activities across the economy and the more so in agriculture.

Despite the declining share of agriculture in GDP, agriculture remains important for creating employment for rural low-skilled workers. However, better-paying jobs in light manufacturing for low-skilled workers are driving labour away from agriculture creating labour shortages. In this regard, improving the earnings from agriculture is important for the welfare of the farmers, as well as for retaining workers in agriculture. Improving land and labour productivity is an important means of improving agricultural earnings. However, in South Asia, changes to land and labour productivity are slow or unobservable (Yamauchi, 2021). One means of improving labour productivity is mechanization and switching to a higher value, more climate-resilient seed varieties. Public investment in research and development and extension services are key to identifying and developing more productive seed varieties and machines appropriate to small farms. Further, to ensure the resilience of these developments to different adverse shocks they should rely mostly on local inputs and knowledge and benefit all socio-economic groups.

In addition, sustainable land management and administration is important for improving investment in agriculture. Though mechanization is an important means of improving labour productivity, mechanization is most efficient and effective on large parcels of land. However, there has been a sharp decline in farm size in many countries in South Asia, including Pakistan, India, Nepal, Bangladesh and Sri Lanka (Yamauchi, 2021).

Noting this background, this paper aims to provide the development context for policy-research capacity development needs for climate adaptation and inclusive development in South Asia. The paper first discusses the development context in South Asia in terms of the region's economy, trade, poverty, food security and structural transformation. Then, it examines agricultural development in South Asia in terms of production increase, yield growth and land use change, agricultural labour use and mechanization and trade relations with a particular focus on the Sri Lankan context. This is followed by an analysis of the evolution of agricultural policies. Finally, the paper concludes by identifying the ongoing challenges for agriculture in South Asia and makes several recommendations.

## 2. South Asia: the development context

### 2.1 South Asian economy

Most countries in South Asia are lower-middle-income, with GNI per capita within the range of USD 1,036 and USD 4,405. The only upper-middle-income country in the region is the Maldives, while the prolonged political crisis has plunged Afghanistan into being the only low-income country in South Asia (Table 1). However, Bangladesh, Bhutan, Nepal and Afghanistan fall into the category of least-developed countries (LDCs). Figure 1 reveals the evolution of income growth over time for the eight South Asian countries. Figure 2 shows the sectoral composition of the domestic output across agriculture, services and industry sectors in 2019. One crucial observation is that the sectoral composition of the countries determines the vulnerability to external shocks. For example, the Maldives has a disproportionately large service sector based on the highly vulnerable tourism sector (Figure 2). As a result, adverse shocks introduce large fluctuations to the Maldives economy, as revealed by the deep plunges in per capita income produced by the 2007 global financial crisis and the COVID-19 pandemic in 2019-2020.

All the countries, except Afghanistan, had steady growth in past decades although the rate was below a satisfactory level. In addition, countries such as India, Bangladesh and Nepal have experienced increased growth since the late 1980s, which can be attributed to the measures taken to liberalise their economies. Sri Lanka was early to liberalise its economy in the late 1970s which produced a substantial positive effect (Athukorala & Jayasuriya, 1994; Dunham & Kelegama, 1998). Although South Asian countries have achieved positive economic growth, introduced significant market reforms and achieved greater integration with other global economies, the growth momentum is considerably behind that of East Asian countries<sup>1</sup>. All South Asian

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<sup>1</sup>Figure A1 in the appendix shows the growth of selected ASEAN countries in the period 1960-2021.



countries therefore have a long way to go in reaching the goal of developed country status. Good policies should make this feasible.

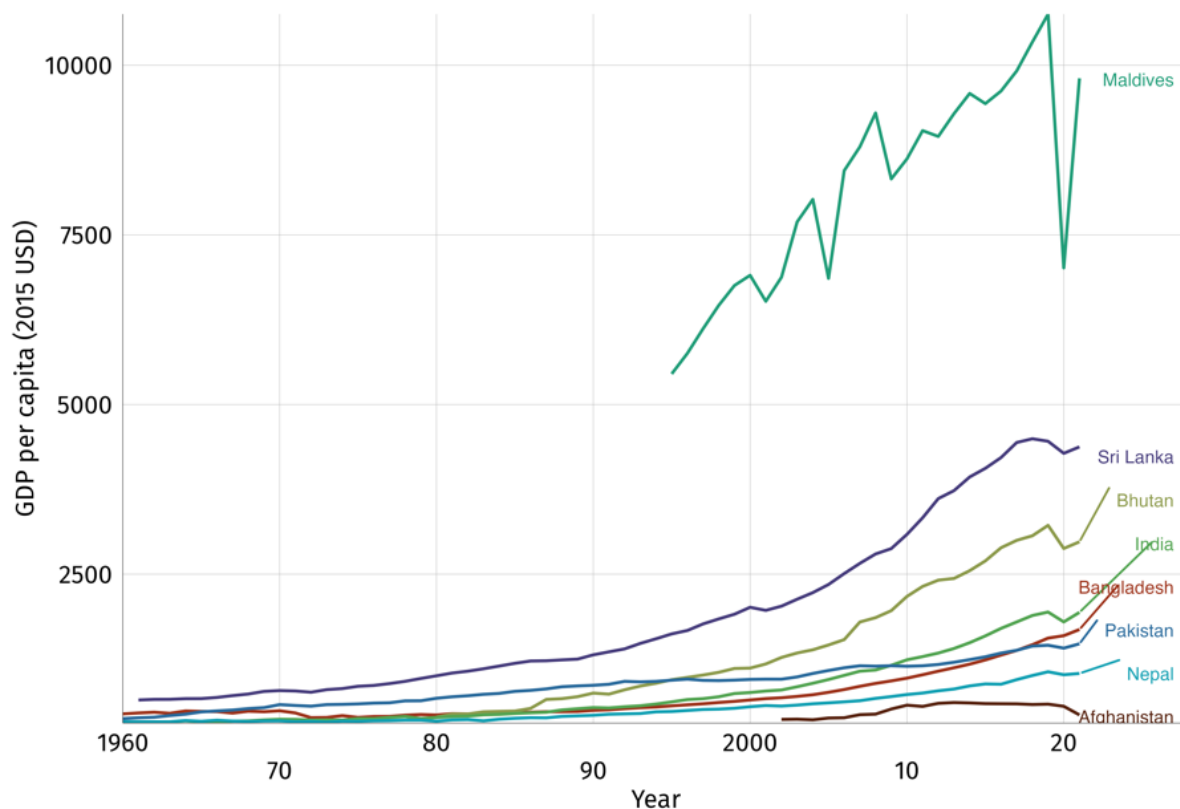
Table 1: Classification of South Asian countries into income groups

<b>Income group</b>	<b>Countries from South Asia</b>
<b>Low-income</b>	Afghanistan
<b>Lower-middle income</b>	Bangladesh, Bhutan, India, Nepal, Pakistan, Sri Lanka
<b>Upper-middle income</b>	Maldives

Notes: *Afghanistan, Bangladesh, Bhutan, and Nepal are least developed countries (LDCs)* Source: Authors' compilation using WDI data

Sri Lanka faces a distinct set of economic challenges, including the presence of unsustainable external debt which generated the most severe form of economic crisis in 2020. To address persistent budget deficits and trade account deficits, Sri Lanka resorted to borrowing. Notably, the issuance of short-term loans in the form of International Sovereign Bonds (ISBs) from the international capital market played a substantial role in securing external financing by 2018. However, as the growth of the tradable sector did not match the pace of borrowing, the country's external debt became unsustainable. The COVID-19 pandemic exacerbated the economic woes, which triggered an unparalleled economic crisis and plunged the nation into a profound recession in 2022 (Mallawaarachchi & Quiggin, 2022). Sri Lanka's future growth prospects face significant risks and are contingent upon the successful implementation of essential reforms to achieve debt sustainability and robust export-led growth.

**Figure 1. Per capita income of South Asian countries (constant 2015 USD):  
1960-2021**

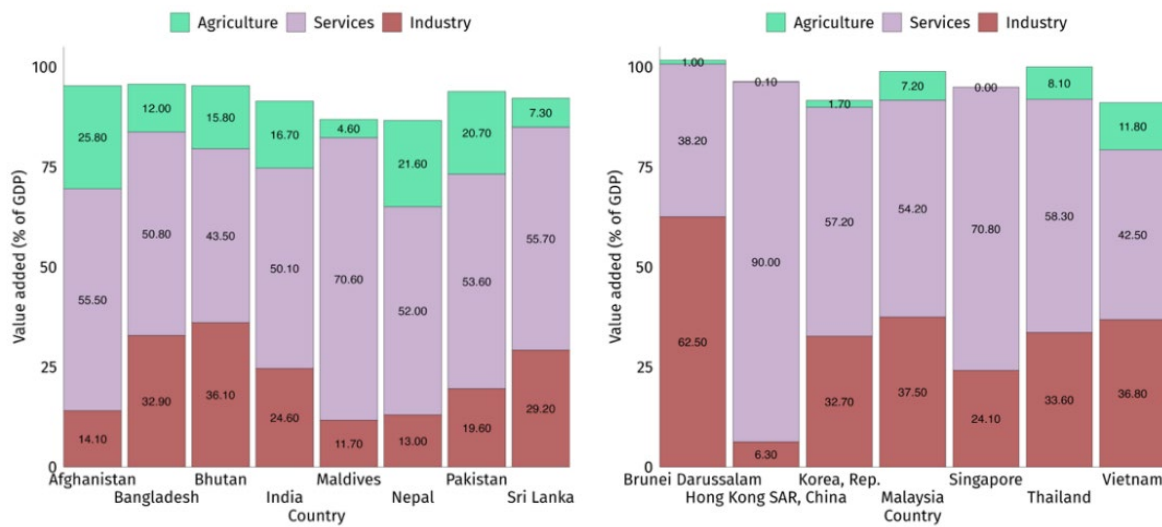


Source: authors' illustration using WDI data

As a result of the liberalisation measures in the late 1980s, most South Asian countries have reduced the agricultural bias of their economies, as revealed by the sectoral contributions to value addition (figure 2). However, Afghanistan, India, Nepal and Pakistan still have considerable scope for further structural transformation by reducing the dependence on agriculture and enhancing growth in other sectors of the economy, as an adaptation strategy to climate risks.

Another observation is the slow growth of industrial sectors in South Asia. Structural change has allowed economies to move away from agriculture to services but without robust growth in the industrial sector. In addition, although the contribution of agriculture to economic output is low, the importance of agriculture as a livelihood is significant. For example, in 2019 Sri Lanka had a quarter of the labour force in the agriculture sector, although the sector's contribution to the GDP was only 8 %. This highlights low labour productivity in agriculture and a resultant high level of rural poverty. South Asia can draw lessons from East Asian economies such as Vietnam and Thailand where a robust industrial sector has facilitated agricultural transformation and rural livelihood diversification (Figure 2).

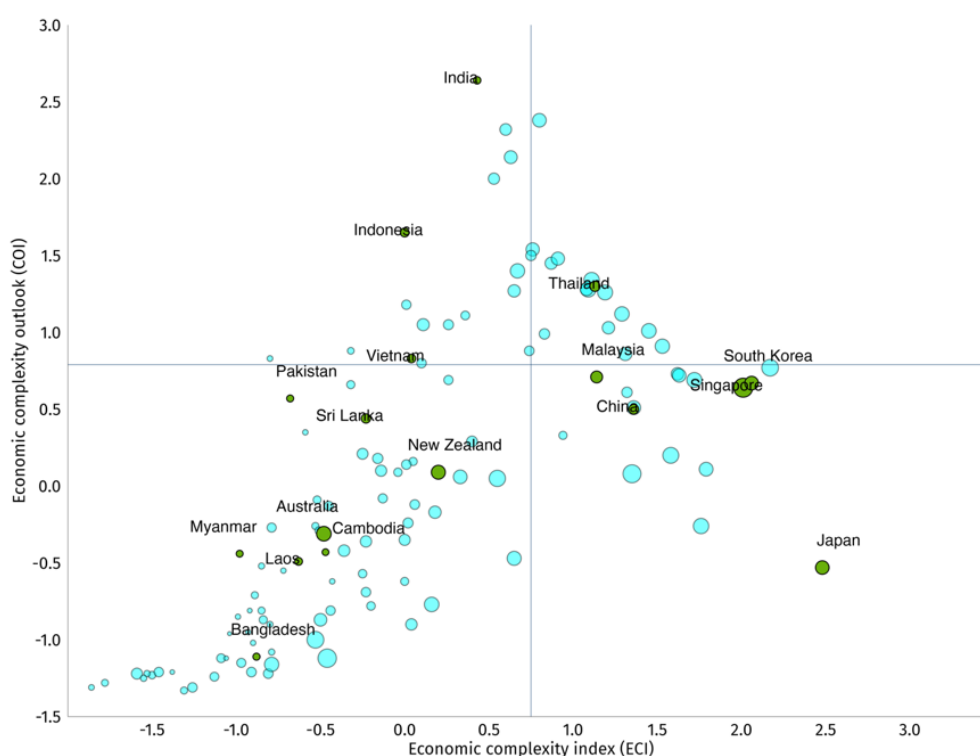
**Figure 2. Sectoral value addition to GDP (%) in 2019 of selected South Asian & East Asian economies.**



Source: authors' illustration using WDI data

The economic complexity index (ECI) measures an economy's ability to produce complex products requiring sophisticated technical know-how (Figure 3). The higher the embedded resource content and technical know-how, the higher the ECI. Importantly, ECI was found to be causal to an economy's income level. Compared to reputed economic success stories such as South Korea, Singapore and Thailand, South Asian economies have a lower ECI ranking. This implies the export basket of these South Asian countries contains fewer products that need significant amounts of resources and knowledge for their production. Countries such as Pakistan, Sri Lanka and Bangladesh export low-tech manufacturing products such as ready-made garments. Figure 3 also shows the relative position of countries according to the economic complexity outlook, or the relative ease with which a country is likely in the future to move into more complex production. In the outlook ranking, India tops globally, indicating India has a higher potential to produce technologically complex products than any other country.

**Figure 3: Position of selected South Asian countries in the economic complexity-economic complexity outlook matrix 2019. The size of the bubble is proportionate to the 2019 per capita income in PPP.**



Source: authors' illustration using ECI and EOI data from the Atlas of Economic Complexity and income data from World Development Indicators

## 2.2 Trade in South Asia

South Asian economies contributed 3.3% of global imports in 2019, while the contribution of exports was 2.18%. Consequently, the region has a trade deficit with the rest of the world. Notably, each South Asian country has faced a persistent current account deficit in most years. For example, Sri Lanka has not achieved a current account surplus since the late 1970s. In that year the surplus resulted from the global commodity boom resulting from Brazilian coffee rust. At that time, export earnings of South Asian countries were prone to sudden fluctuations, as primary commodity exports dominated the commodity basket. In addition, before the 1980s, most of the countries in South Asia were following restricted trade policy regimes geared toward import substitution industrialisation. Quantitative trade restrictions, para-tariffs, and high tariffs on finished product imports are intended to protect domestic consumption-oriented production. The faults of this growth strategy are widely discussed in the

economic literature (Krueger, 1998 ). It is pointed out that import substitution into easily substitutable areas under protectionist trade policies pulls resources away from competitive export-oriented sectors. Import substitution is itself “import intensive” as raw materials and machinery for substitution are imported. The combined effect is that the growth rate of foreign currency outflow exceeds the growth rate of foreign currency inflow, perpetuating the balance of payment crisis. Policymakers and development proponents consistently failed to note these deficiencies.

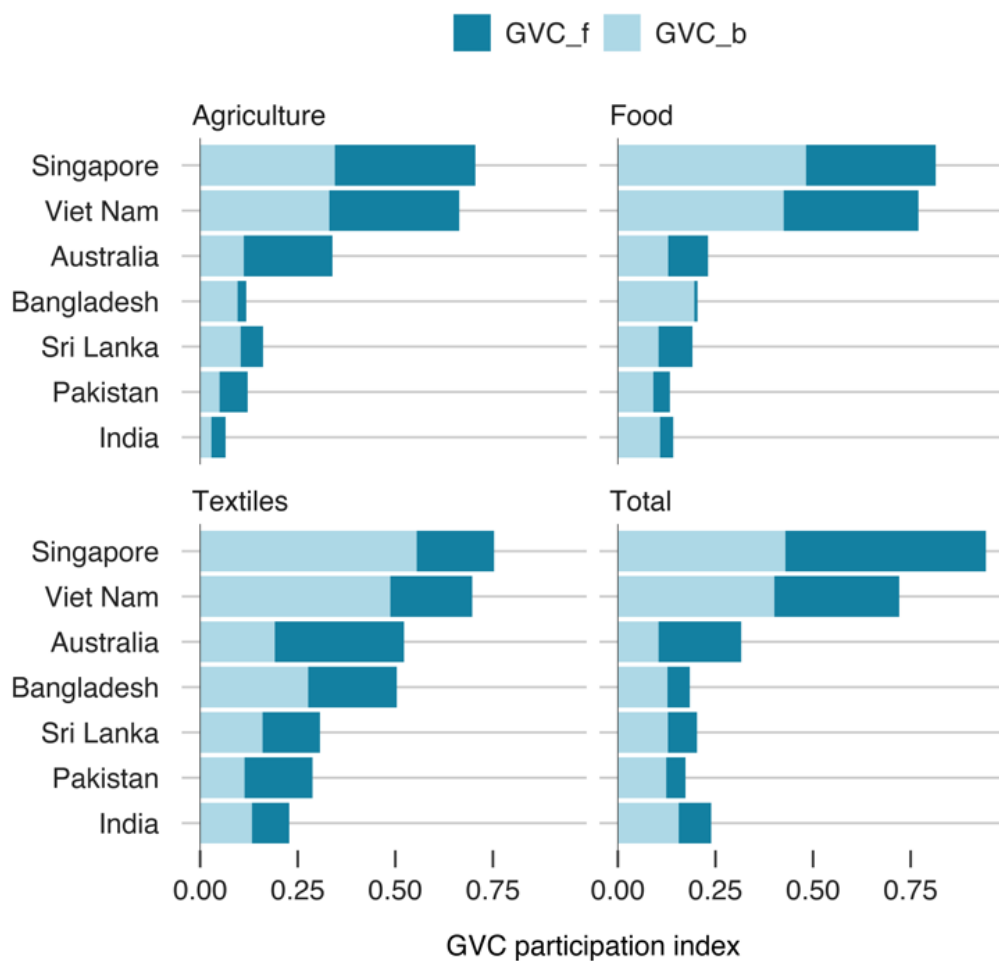
Successive liberalisation attempts since the early 1980s have substantially opened South Asia to the global market. The positive impact of trade on growth, labour market outcomes and poverty alleviation are well-documented in the empirical literature. However, the effect varies sectorally and spatially, and it has been shown that laggard areas have not benefited from liberalisation, indicating the unequal distribution of the dividends of free trade (Krishna, et al., 2010). In addition, it is doubtful that liberalisation has had a positive impact on countries such as Nepal and Pakistan. The agriculture sector of both these countries contributes more than 20 % to the GDP and the industrial sector growth remains unsatisfactory. Moreover, the incremental impact of trade liberalisation on poverty and inequality raises questions as to the effectiveness of domestic policies in facilitating a smooth adjustment (Bhattarai, 2012).

It is observed that when the economic dividends of trade are not distributed, and the adjustment and distributional costs are substantial, trade reforms become politically infeasible and socially disruptive. Increased disparities can induce populist political movements, thus exposing economies to vulnerabilities, which may quickly reverse decades of gain, as has occurred in Sri Lanka.

Often, South Asia is subject to comparisons with the ASEAN success stories regarding regional integration and trade growth. One stark difference between the two regions is South Asia’s weak intraregional trade. Intraregional trade accounts for just 5-7 % of South Asian trade, while a quarter of ASEAN trade is between the ASEAN members. The World Bank has noted that “..it is about 20 % cheaper for a company in India to trade with Brazil instead of a neighbouring South Asian country” due to border issues. The import destinations of exports originating from South Asian countries are the European Union and North American countries. Border issues, inadequate infrastructure, political disputes and weak regional trade agreements hamper intraregional trade. Theoretically, consistent gravity estimates show that the trade effect of regional trade agreements (RTA) is trivial in South Asia (Wijesinghe & Yogarajah, 2022a; Wijesinghe & Yogarajah, 2022b). The weaknesses of the existing trade agreements are widely discussed in the academic literature (Weerakoon, 2010; Weerakoon & Thennakoon, 2006): however, such studies have not led to policy changes. Long sensitive lists, that strategically put exporting country’s products at a comparative advantage and regulatory barriers such as rules of origin (ROO) weaken the effectiveness of regional trade agreements. South Asian countries are not participating in global value chains (GVC) to the extent that Vietnam and Singapore do. Wijesinghe & Yogarajah (2022b) (Figure 4) show the extent to which RTAs

negatively affect the global value chain participation of South Asian countries in agriculture and food trade.

**Figure 4: Backward and forward GVC participation of selected countries in 2019**



Source: Wijesinghe & Yogarajah (2022b)

As shown in Figure 4, South Asian countries have low-product complexity implying that the countries produce primary or low-tech manufacturing products. As there is a causality between the economic complexity of a country and the income level, diversifying into high-tech manufacturing is a necessary pathway to economic

resilience (Table 2)<sup>2</sup>. For small economies with limited investment capital, aiming to produce a whole consumer-ready product is not feasible, given the required economies of scale for ensuring competitiveness. The way forward lies in successfully integrating with global manufacturing value chains. Globally, evidence indicates that countries integrate more, even in agricultural and food value chains. Empirical evidence points to the importance of enabling trade policies for successful participation in the GVCs (Balié, et al., 2019). Against this backdrop, South Asia needs to introduce reforms to regional integration measures and in particular to RTAs and existing tariff structures so as to accelerate the region's journey toward accelerated economic development.

**Table 2 Major importers and top exports of South Asian countries (year=2019)**

Country	Top five importers	Top exports
<b>Afghanistan</b>	India, Pakistan, China, Turkiye, UAE	Vegetables and fruits; crude animal and vegetable material; cola, coke, and briquettes
<b>Bangladesh</b>	USA, Germany, UK, Spain, France	Articles of apparel and clothing accessories, knitted or crocheted; articles of apparel and clothing accessories, not knitted or crocheted; footwear, gaiters and the like; parts of such articles
<b>Bhutan</b>	India, Bangladesh, Italy, Japan, Nepal	Iron and steel; salt, lime and cement; inorganic chemicals; organic or inorganic compounds of precious metals
<b>India</b>	USA, UAE, China, Hong-Kong, Singapore	Petroleum and petroleum products; non-metallic mineral manufactures; miscellaneous manufactured articles
<b>Maldives</b>	Thailand, Germany, France, USA, UK	Fish (not marine mammals), metalliferous ores and metal scrap; feeding stuff for animals
<b>Nepal</b>	India, USA, Germany, Turkiye, UK	Animal or vegetable fats and oils; man-made staple fibres; and coffee, tea, maté, and spices
<b>Pakistan</b>	USA, China, UK, Germany, Afghanistan	Textile yarn and fabrics; articles of apparel and clothing; cereals and cereal preparations
<b>Sri Lanka</b>	USA, UK, India, Germany, Italy	Articles of apparel and clothing; coffee, tea, cocoa, and spices; rubber products

**Notes:** Key sectors of Afghanistan, India, Maldives, Pakistan and Sri Lanka are given as Standard International Trade Classification (SITC). However, for Bangladesh, Bhutan and

<sup>2</sup> Table 2 lists the key export products of each South Asian country. Textiles and wearing apparel dominate the export basket of Bangladesh, Pakistan and Sri Lanka. Afghanistan and Nepal mainly export agricultural products. India and Bhutan have mineral and fuel products as their main exports. In contrast, ASEAN countries, export complex products like electric circuits, components and semi-conductors. Specialisation in electric component production has increased the exports to GDP ratio beyond 100 in countries such as Vietnam.

Nepal WITS does not report data in SITC sectors. Thus, for those countries, three major HS chapters are reported.

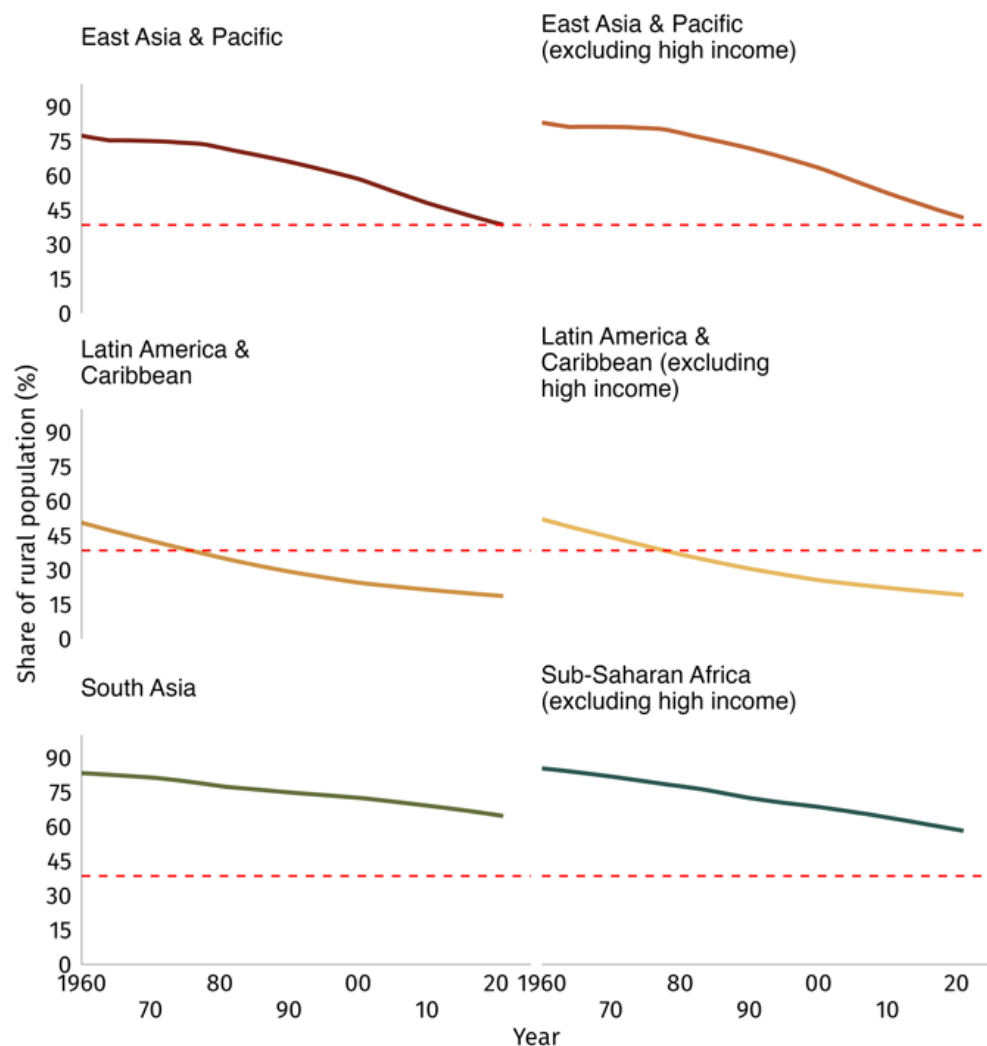
**Source:** authors' compilation using Trade Map and WITS data.

It is noteworthy that reduced agricultural tariffs, especially after 1995, have not led to the successful development of agricultural industries based on comparative advantage. This is because the ability to capitalise on comparative advantage is often weakened by distortionary subsidies, the inability to invest in meeting sanitary and phytosanitary measures and other non-tariff barriers to South Asia's agricultural and food exports. Institutional development, investment in quality assurance and accreditation and legal expertise in dispute settlement will be needed to circumvent the above-mentioned issues. Anecdotal evidence also suggests that poor on-farm practices are largely the source of difficulties in meeting quality and consistency requirements for food trade, which are easily amenable through targeted extension advice and business practice improvements.

South Asia is home to nearly a quarter of the world's population. Achieving robust economic growth while ensuring food security and livelihoods of a very large rural sector population is a significant policy challenge (Figure 5). Moreover, when climate change impacts are taken into account, drastic changes in production patterns might be required to adapt to changes in natural comparative advantage.



**Figure 5 Share of the rural population in different regions of the world:**



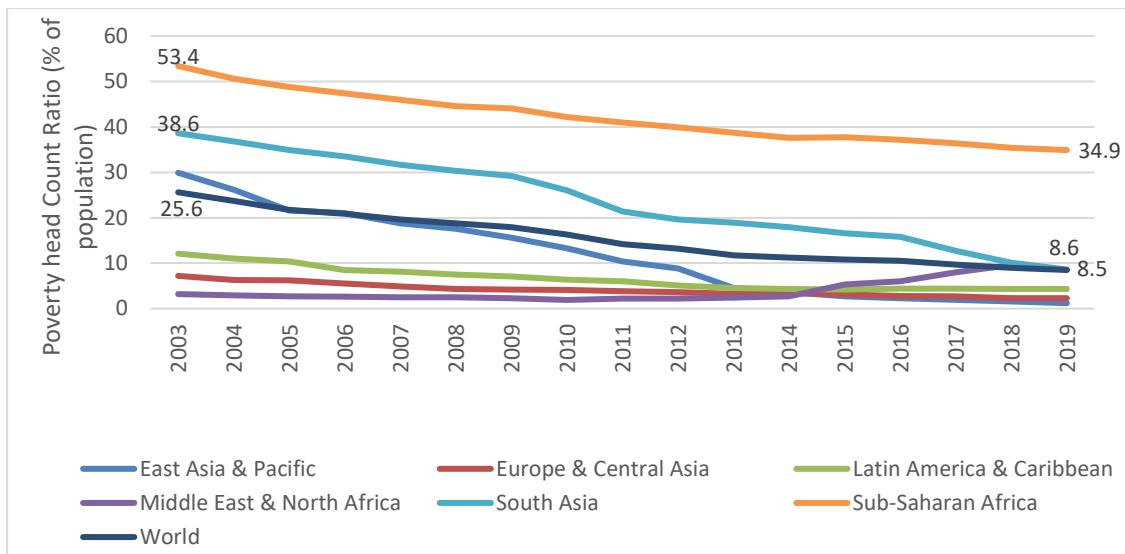
**1960-2021**

Source: Authors' illustration using WDI data

### 2.3 Poverty in South Asia

Figure 6 illustrates areas of regional extreme poverty reduction (poverty is defined as those who live on less than \$2.15 per person per day in 2017 purchasing power parity) compared with the world's average poverty headcount ratio during the period of 2003-2019. On average, 8.5% of the world's population, or about one in twelve people (658 million), lived in extreme poverty in 2019. South Asia performed remarkably well in poverty reduction over that period, with the poverty headcount ratio falling from 38.6% to 8.6%. However, South Asia still accounts for 24.3% of people living in extreme poverty worldwide (160 million extremely poor in South Asia out of the estimated 658 million extremely poor worldwide). It is only second to Sub-Saharan Africa (headcount ratio of 34.9%) which carries the highest number (391 million) and proportion of the world's extremely poor (59.5%).

**Figure 6: Global and regional poverty headcount index, 2003-2019**



Source: authors' calculation based on PovcalNet of the World Bank

The latest available poverty headcount ratio for South Asian countries along with the world's and South Asia's average headcount indices are given in Table 3. Four out of five extremely poor in the South Asia region resided in India. Despite a poverty headcount rate of 10%, India's large population of 1.38 billion results in a high absolute number of poor (138 million) making India a centre of opportunity for poverty alleviation. Bangladesh has made remarkable progress in reducing poverty, but its large population still maintains it in second place within the region in terms of the absolute number of extremely poor (22 million). Pakistan has a larger population than Bangladesh, but a smaller number of extremely poor (10.8 million). Nepal and Pakistan have seen a consistent and significant decline in poverty over the last 2-3 decades. The headcount indices of Nepal and Pakistan are 8.2% (2010) and 4.9% (2018) respectively. In contrast, Bhutan (0.9%) and Sri Lanka (1%) have the lowest headcount ratios in the South Asian region. In the Maldives, extreme poverty is nearly non-existent according to the latest survey data. Overall, South Asia remains a centre of opportunity for economic reform in improving the quality of life of people drawing on the advantages of unmet demand for significant consumption growth. A new policy focus that encourages sustainable growth practices with a human development focus is needed to propel South Asia's move toward sustainable prosperity over the coming decades.

**Table 3: Poverty headcount index and number of extremely poor in South Asia**

	Most Recent Year	Poverty Headcount Ratio (% of the population)	Number of Extreme Poor	Population (Million)	GNI per capita (Current USD)
<b>Bangladesh</b>	2016	13.5	22 million	160	1,410
<b>Bhutan</b>	2017	0.9	6,805	0.7	2,760
<b>India</b>	2019	10.0	138 million	1,380	2,080
<b>Maldives</b>	2019	0.0	0	0.5	10,160
<b>Nepal</b>	2010	8.2	2.2 million	27	540
<b>Pakistan</b>	2018	4.9	10.8 million	220	1,610
<b>Sri Lanka</b>	2019	1.0	218,030	22	4,220
<b>South Asia</b>	2019	8.6	160 million	1,860	2,012
<b>World</b>	2019	8.5	658 million	7,740	11,498

Source: author's calculation based on PovcalNet of the World Bank

South Asia has fared badly during the past few years, following the COVID-19 pandemic and the war in Ukraine which had a strong negative impact on peoples' real incomes across the globe. Inflation in South Asia rose in the aftermath of the pandemic, increasing income inequalities and pushing more people into poverty (East Asia Forum, 2022). Further, the education and health outcomes were set back for millions of vulnerable people eroding the human capital in the region. Almost two-thirds of the people who fell or remained in extreme poverty globally due to the pandemic live in South Asia (The World Bank, 2022). Russia and Ukraine combined have a significant share in global supplies of 3F (fuel, fertilizer, and food). The war has adversely impacted key supply chains across the globe, diminishing the effect of recovery efforts from the global pandemic. Its direct impact on South Asia occurred particularly through rising commodity prices as most of the countries in the region are net importers of 3F. Climate change is acting as a key factor that contributes to and exacerbates poverty and exposes the most vulnerable segments of the population to significant livelihood risks, entrenching poverty and food insecurity.

## 2.4 Food security and nutrition status in South Asia

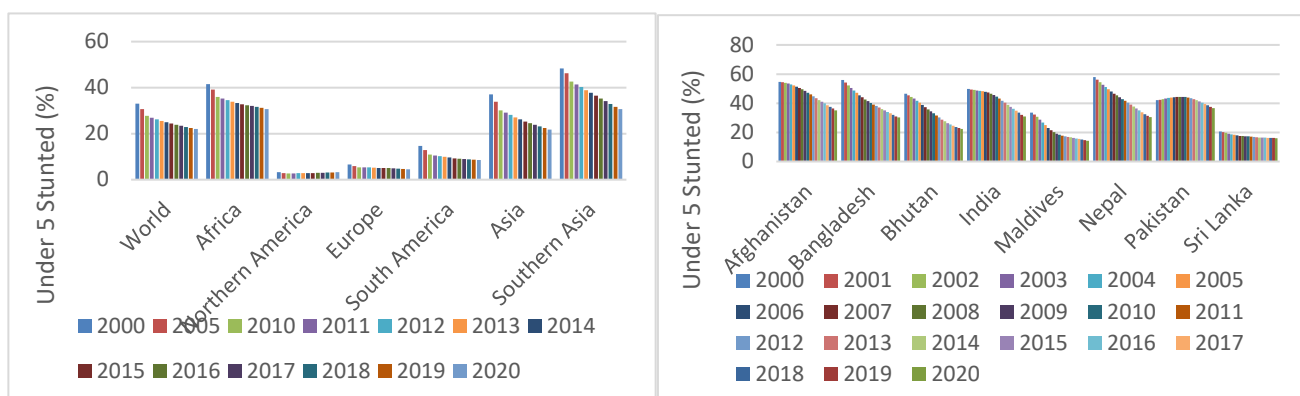
Food security is achieved when all people at all times have physical and economic access to sufficient, safe, and nutritious food to meet their dietary needs and food preferences for an active and healthy life (FAO, 2006). Food security has four major dimensions, namely, availability, access, utilization and stability. This section focuses briefly on the current food security and nutrition status of the region which is shown by the well-known measures of malnutrition; stunting, wasting and low birth weight.<sup>3</sup> In

<sup>3</sup>The World Health Organization (WHO) recognizes stunting, wasting and underweight as 'the proportion of under-five falling below minus 2 and minus 3 standard deviations from the median height-for-age of reference population'; 'the proportion of under-five falling below minus 2 and minus 3 standard

South Asia, 30.7%, 14.1%, and 26.4% of children under five years have suffered from stunting, wasting and underweight, respectively. Food security in South Asia remains a significant challenge despite the region's substantial agricultural potential. South Asia is home to a large and diverse population with millions of people facing issues of hunger, malnutrition and inadequate access to nutritious food.

The prevalence of stunting has declined over the years in all regions, and South Asia has a prevalence similar to the African region in 2020, while the prevalence of wasting is worse than that in the African region (6%) (Figures 7 and 8). Stunting is relatively higher in almost all the countries in South Asia. Pakistan (36.7%), Afghanistan (35.1%), India (30.9%), Nepal (30.4%), and Bangladesh (30.2%) have the highest prevalence of stunting in the region in 2020 (Figure 7). Maldives (14.2%) has the lowest but still high levels of prevalence of stunting in the region falling closely with Sri Lanka (16%). However, there is a declining trend of stunting in all South Asian countries in general. Based on the latest available figures, wasting is highest in India (17.3% in 2017) followed by Sri Lanka (15.1% in 2016) and Nepal (12% in 2019) whereas Afghanistan (5.1% in 2018) has the lowest prevalence of wasting followed by Pakistan (7.1% in 2018) and Bangladesh (9.8% in 2019) (Figure 8).

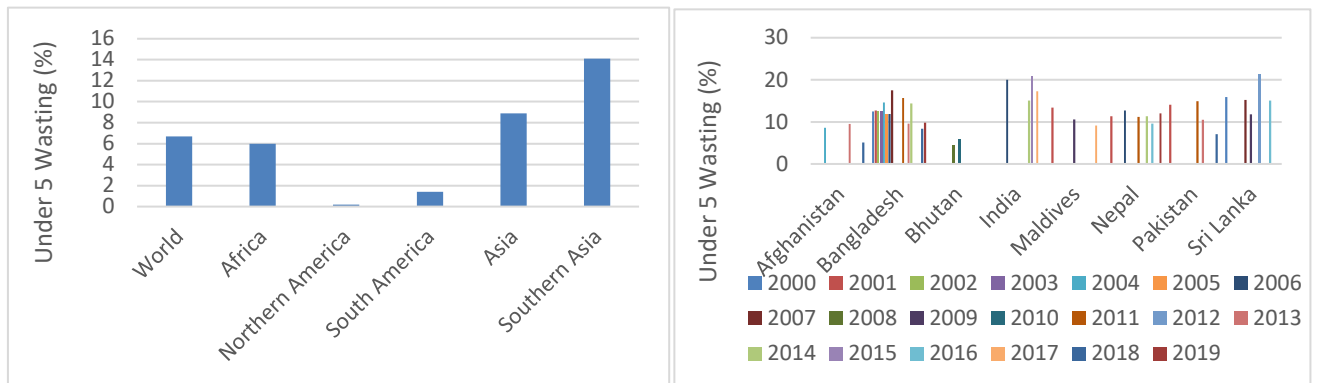
**Figure 7: Prevalence of under 5 stunting in South Asia (%)**



Source: Authors' calculation based on FAOSTAT data (FAO, 2023)

*deviations from the median weight-for-height of reference population' and the "proportion of under-five falling below minus 2 standard deviations (moderate underweight) and minus 3 standard deviations (severe underweight) from the median weight-for-age of reference population".*

**Figure 8: Prevalence of Under 5 Wasting in South Asia (%)**

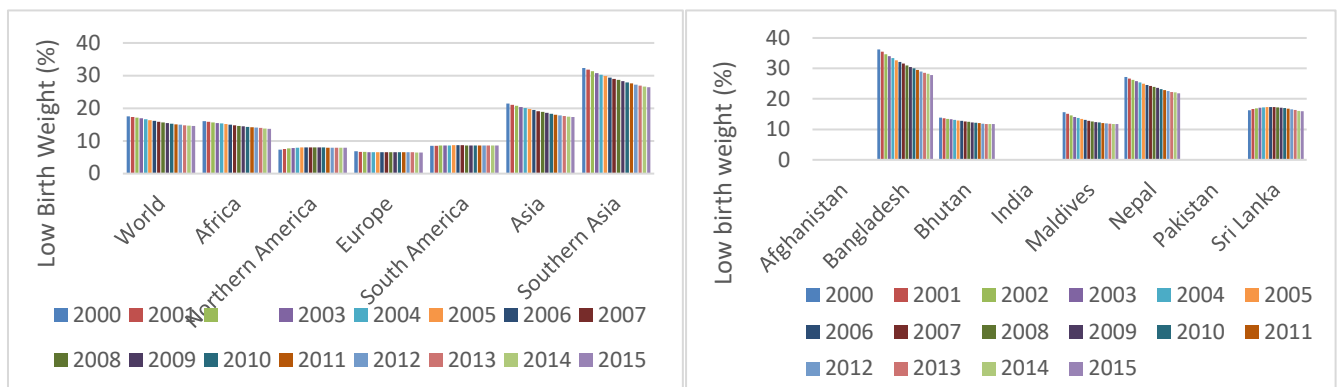


Source: Authors' calculation based on FAOSTAT data (FAO, 2023)

The prevalence of underweight in South Asia is in a declining trend (Figure 9). However, it has the highest prevalence of underweight (26.4% in 2015) which is almost double the rate in Africa (13.7%). Bangladesh (27.8%) has the highest prevalence of underweight followed by Nepal (21.8%). Bhutan and Maldives (11.7% each) have the lowest underweight prevalence followed by Sri Lanka (15.9%). Unlike the prevalence of stunting and underweight, the prevalence of wasting is stagnant in the region, especially in India, Sri Lanka and Nepal. Notably, underweight prevalence is stagnant in Sri Lanka, unlike the rest of the countries in South Asia.

South Asia's future lies in the power of its people. Unless these significant human development trends in poverty and undernutrition are addressed systematically, South Asia and the rest of the world that relies on South Asian skilled labour will be exposed to the heightened quality of life risks.

**Figure 9: Prevalence of Underweight in South Asia (%)**

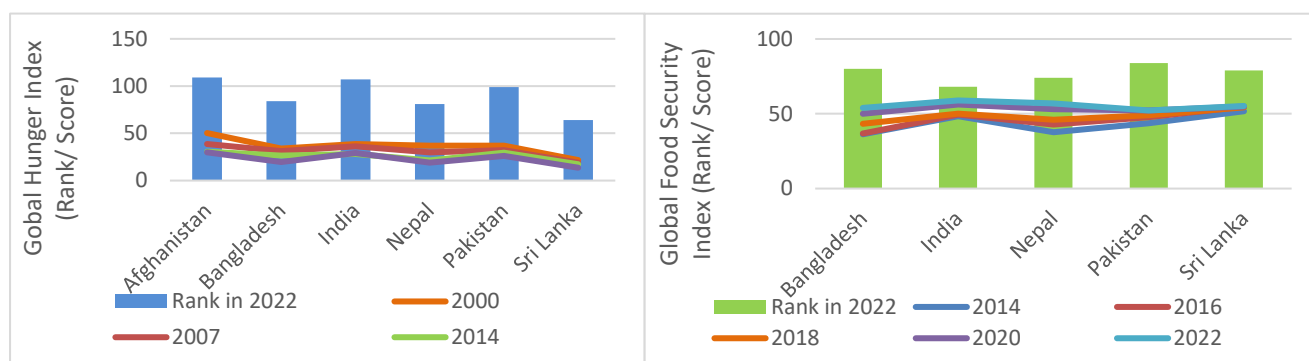


Source: Authors' calculation based on FAOSTAT data (FAO, 2023)

All these are reflected in the global rankings of hunger and food security presented by the global hunger index (GHI) 2022 (IFPRI, 2022) and global food security index (GFSI) 2022 (The Economist, 2022) which indicates that the region needs significant improvements in the food system. Afghanistan (109) has been ranked lowest in the GHI followed by India (107) and Pakistan (99). Sri Lanka (64) has been ranked first followed by Nepal (81) and Bangladesh (84) (Figure 10). According to the GFSI, India

(68) ranked first followed by Nepal (74) and Sri Lanka (79) while Pakistan (84) and Bangladesh (80) have been ranked poorest in the South Asian region. All the countries in the region have shown an improving trend over the years in terms of the scores of both GHI and GFSI. Nepal and Bangladesh have shown the highest improvement while Sri Lanka shows the lowest improvement. Growth that does not create benefits across the population does not contribute to sustained social development on which the growth depends.

**Figure 10: GHI and GFSI ranking and Scores of South Asian Countries**



Source: authors' calculation based on GHI and GFSI data

## 2.5 Structural Transformation in South Asia

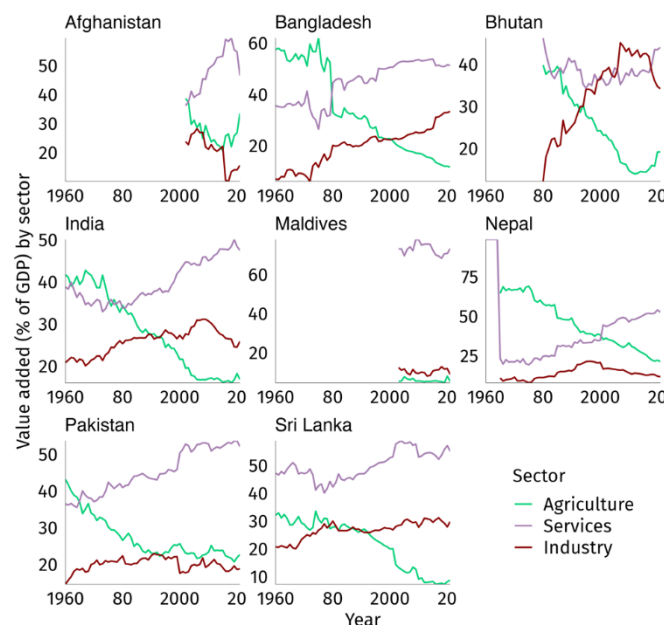
The term “structural transformation” implies a change in an economy’s sectoral composition from predominantly agriculture to larger manufacturing and services sectors. The economic rationale for structural transformation is linked to the relative productivity differential between agriculture and other sectors. It follows that, for robust economic and productivity growth, an economy should increase the manufacturing share of the value addition. Once the general income level goes up, the service sector will start taking up more of the economy. However, manufacturing sector growth is imperative due to the greater scope for productivity growth. Moreover, manufacturing mostly involves the tradeable GDP sector. Capitalising on comparative advantage, countries can expand manufacturing production — including those derived from agriculture, thus achieving economies of scale. This notion, however, was also linked to the observation that merchandise trade is relatively more liberalised globally, whereas agricultural trade was regulated, including in rich countries. Efforts to deregulate agricultural markets have repeatedly failed, despite evidence that deregulation helps to enhance efficiency and stability, as is evident in Australia and New Zealand, even during times of crisis (Greenville, 2020).

South Asian countries have undergone a rapid transition in the sectoral composition of GDP (Figure 11). The share of the output of agricultural value additions has dropped persistently in all the countries except Afghanistan (Figure 12). One observation of the structural transformation in South Asian countries is that the phase of contraction of the agricultural labour force was not on par with the contraction of the share of the

agriculture sector in GDP. That is, agriculture has retained an overly large share of employment, owing to a lack of opportunities elsewhere.

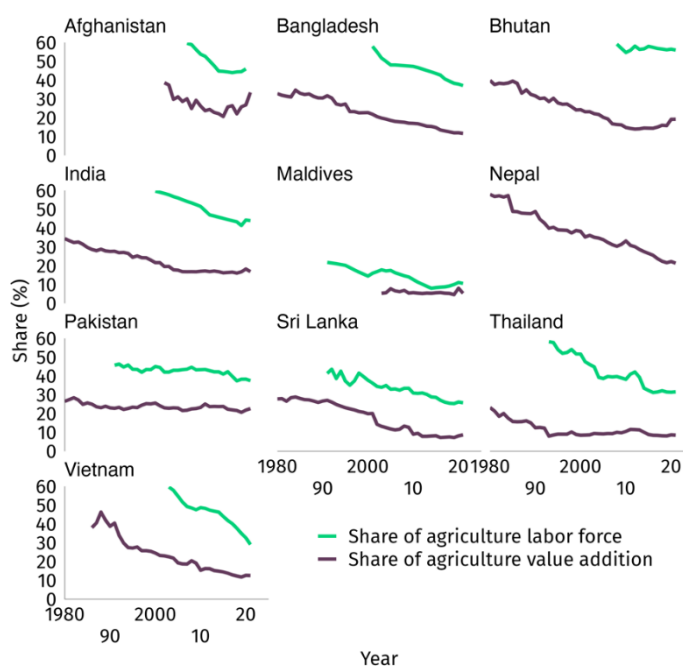
The calculations shown in Table 4 imply that the share of the agriculture sector to GDP contracted rapidly compared to the contraction of the labour force in agriculture. However, Vietnam and Thailand, two major economies of the ASEAN region, experienced a relatively faster contraction of the agricultural labour force and its contribution to GDP. In addition, the growth of the industrial sector in South Asia was not as widespread as the manufacturing sector growth in ASEAN countries. In parallel to the contraction of the agriculture sector's contribution to the GDP in south Asia, the service sector's contribution to the economy has increased. However, it is important to expand the industrial sector first, as the productivity and growth potential of the sector is high (Jha & Afrin, 2021). In this respect, the policy mix that addresses the push and pull factors between agriculture and the rest of the economy is crucial in facilitating a desired level of sectoral composition reflecting each country's comparative advantage. Industry does not necessarily mean traditional mass production systems; South Asia's diversity allows for more innovative ways of creating opportunities linked to agro-industrial and environmental service industries that can generate sustainable employment and growth pathways.

**Figure 11 Change of the sectoral composition of the economies of South Asia: 1960 - 2021**



Source: Authors' illustration using WDI data

**Figure 12: Evolution of agriculture labour force share and agriculture value addition share of the output: South Asian countries + Thailand and Vietnam**



Source: Authors' illustration using WDI data

**Table 4: Difference between average annual growth of agricultural labour force (%) and average annual growth of agriculture value addition to output (%)**

Country	Average annual growth of agricultural labor force	Average annual growth of agriculture value addition
Afghanistan	-1.03	0.09
Bangladesh	-1.79	-2.31
Bhutan	-0.85	-1.60
India	-1.20	-1.40
Maldives	-2.18	2.08
Nepal	-0.75	-1.88
Pakistan	-0.62	-0.98
Sri Lanka	-1.43	-1.78
Thailand	-2.08	-2.02
Vietnam	-3.07	-2.88

Notes: Labor force share and value addition share data are unavailable for the entire period between 1960-2021. Share of agricultural labour force data is available for each country as Afghanistan-1991-2020; Bangladesh, Bhutan, India, Maldives,



Pakistan, Sri Lanka, Thailand, and Vietnam -1991-2021. Share of agriculture sector value addition data is available as Afghanistan- 2002-2021; Bangladesh (1960-2021), Bhutan (1980-2021), Maldives (2003-2021), Nepal (1965-2021), Pakistan (1960-2021), Sri Lanka (1992-2021), Thailand (1960-2021), and Vietnam (1986-2020).

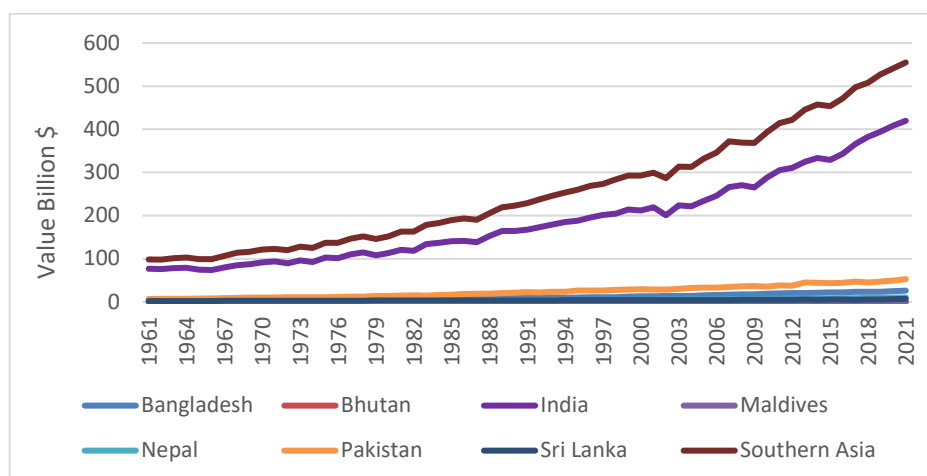
Source: Authors' calculations using WDI data

### 3. Agriculture in South Asia: past, present, and future

#### 3.1 Agricultural Production and Productivity

The region's diverse climate and fertile lands make it suitable for cultivating a wide range of crops. The growth in the value of agricultural outputs from South Asian countries for the period from 1961 to 2021 has been dramatic (see Figure 13). This growth has occurred, especially through the expansion in arable land, crop intensification and yield growth (due to technological advancement). This has helped meet the growth in demand resulting mainly from population growth and modest growth in per capita calorie consumption (Morita, 2021). However, the growth rate of agricultural production in South Asia which was 2.98% from 1961 to 2021, has not been uniform across different countries in the subcontinent. The highest growth was recorded in Pakistan (3.65%) followed by Nepal (3.24%), while the lowest growth is in Bhutan (1.39%), followed by Sri Lanka (2.36%). India recorded a relatively higher growth rate of 2.97%, which is almost equal to the South Asian average (2.98%). The growth rates of Bangladesh and Maldives were 2.70% and 2.54%, respectively.

**Figure 13: Gross production value-agriculture (constant 2014-2016 billion US\$)**



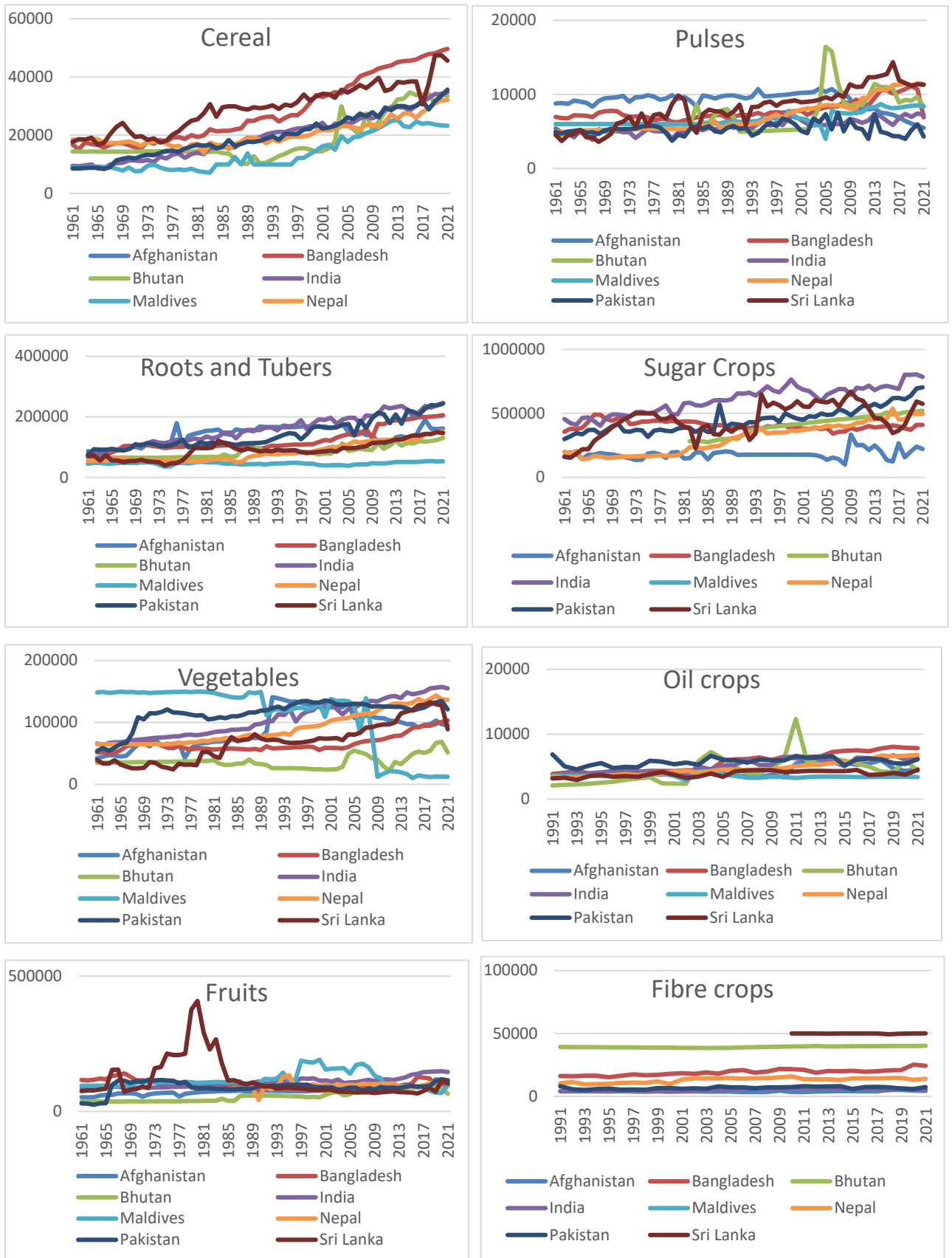
Source: authors' calculation based on FAOSTAT data

Since independence from colonial rule, investments in agriculture occupied a top position in the public investment programs of South Asia, especially Sri Lanka. A major share of these investments was on irrigation development and land settlement projects that increased the cultivable area substantially. The growth in yield levels and the expansion in arable land contributed significantly to the growth in agricultural production. Governments also invested in research and extension facilities which led to the introduction of green revolution technology package across Asia. The key benefit of this strategy lies in the development of high-yielding varieties (HYVs), together with a push for the use of external inputs to achieve yield gains comparable with that observed in research stations that pioneered the green revolution. Subsequently, governments promote this technology package by offering subsidies for fertilizer use and expansion of irrigation. These were the core elements of public investments in agriculture after South Asian countries gained independence: and instruments such as price support can be considered ancillary to this core strategy (Senaratne & Rodrigo, 2014). Some evidence now suggests that the net gains of the package including environmental and net economic gains could have been improved had local comparative advantage been given due consideration in policies that guided adoption decisions by resource-poor smallholders (Pingali, 2012).

### **3.2 Changes in yield levels in agriculture**

In terms of yield growth in South Asia, the biggest yield growth can be seen in cereals and sugar cane (Figure 14). Wheat, maize, and rice yields in South Asia increased by an average of 260%, 255%, and 172% respectively from 1961-2021. This yield enhancement has been attributed to the replacement of short-duration rain-fed varieties with long-duration irrigated high-yielding varieties. However, because of largely focussing on increasing the supply of cereals - the staple of the Asian diet - the yield levels of most of the other domestically grown food crops have stagnated for more than a decade at unimpressive levels even by developing country standards. Therefore, domestic production will fall short of meeting national requirements even under present levels of per capita food consumption. This reinforces the need for reconsidering land use priorities or finding extra foreign incomes to support imports.

**Figure 14: Yield levels of main crop groups in South Asia (Hg/ha)**

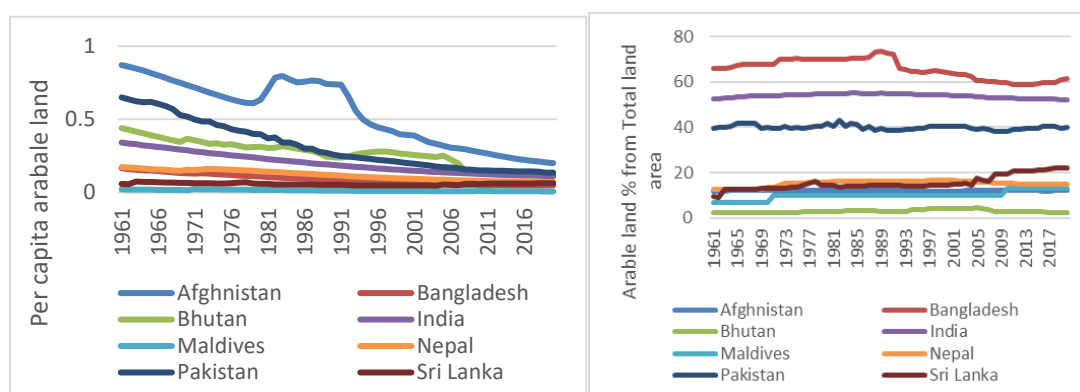


Source: authors' calculation based on FAOSTAT data (FAO, 2023)

### 3.3 Land use changes in agriculture

South Asia is facing significant challenges related to the declining area of arable land (Figure 15). Several factors contribute to this decline, including population growth, urbanization, environmental degradation and unsustainable land use practices. The availability and quality of arable land can vary within each country and region due to factors such as topography, climate and water availability. For example, India has an extensive area of arable land while Bhutan and Maldives have very limited amounts. As the population is growing at approximately 1% annually and per capita income is rising at 7% per year, the national requirements for food supply will be rising constantly in these countries in the years to come. However, the share of arable land is declining slightly or remains flat, and the per capita availability of arable lands is falling as land becomes more and more infertile and fragmented. Climate change will exacerbate these scarcity impacts, thus adding to the pressure to re-evaluate land use policies towards more productive and resilient farming systems that are more focused on making the best use of locally available resources.

**Figure 15: Declining share and per capita arable land area in South Asia**



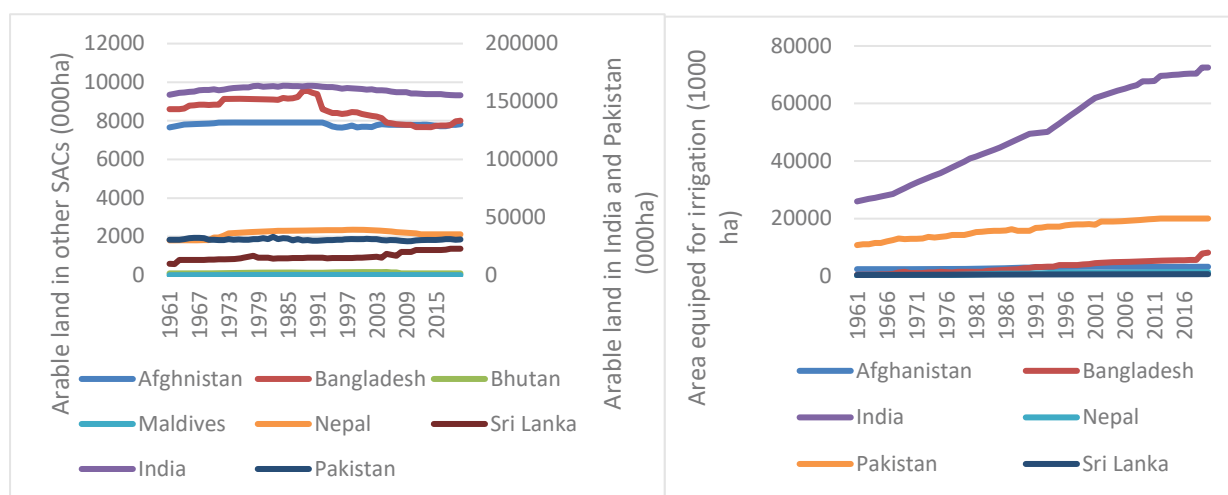
Source: authors' calculation based on FAOSTAT data (FAO, 2023)

In Sri Lanka., the Economic Census 2013/14 found that the agricultural land area (permanent crop area and arable lands) was 3.34 million ha or 51% of the total area of Sri Lanka. Moreover, of the 4.3 million agricultural land holdings, 46.7% were less than 0.1 ha and 53.1% were between 0.1-8.0 ha. While holdings over 8 ha in size accounted for 0.2% of total agricultural holdings, they occupied 1.0 million ha (17.7%) of agricultural land. These indicate that an expansion of the area will not be a solution to meeting the growing food requirement. A possible solution to this problem from the domestic production front is through technological advancements and quality improvements based on information systems that match land use and management to land capability and resource constraints faced by smallholder farmers.

### 3.4 Irrigation and agriculture

Irrigation plays a crucial role in agriculture in South Asia, where the availability of water resources can vary significantly based on climate, topography and monsoon patterns. In many parts of South Asia rainfall is seasonal and unevenly distributed. Therefore, irrigation helps to provide a consistent and reliable water supply to crops throughout the year, reducing the dependency on unpredictable monsoons. Its importance is further shown by the prospect that the availability of land may become irrelevant in the absence of a reliable water supply. For example, many regions with extensive areas of arable land such as Bangladesh and Afghanistan, continue to record poor yields for major crops primarily due to inadequate irrigation facilities (Figure 16). Yield growth has occurred both in water-scarce and water-rich regions, though at a higher rate in the former, highlighting the important role of irrigation and water management (Morita, 2021). In countries such as Sri Lanka, irrigation development, particularly the development of reservoir irrigation systems has substantially contributed to increased cropping intensity even with a minor increase in arable land under cultivation.

**Figure 16: Arable land and irrigated area in South Asia**



Source: authors' calculation based on FAOSTAT data (FAO, 2023)

Sri Lanka is relatively well endowed with water resources which include 103 distinct river basins with a total length of about 4,500 km of watercourses: 309 man-made major irrigation reservoirs and about 12,000 minor irrigation reservoirs with a total irrigable area of approximately 170,000 ha. The estimated annual water supply per capita of 2,329 cubic meters is above the standard international threshold of 1,700 cubic meters per person. Annual freshwater withdrawal<sup>4</sup> is only about 25% of the total resource, which is far below the 40% adopted by the United Nations to mark water scarcity. Water demand in 2025 will be less than half of the available water resources and will require an increase of less than 50% of the water withdrawn in 1991. In

<sup>4</sup> Annual freshwater withdrawals refer to total water withdrawals, not counting evaporation losses from storage basins, measured in cubic metres (m<sup>3</sup>) per year. <https://databank.worldbank.org/metadataglossary/world-development-indicators/series/ER.H2O.FWDM.ZS>

general, Sri Lanka as a whole faces little or no scarcity risks, either physical or economic (Samad, et al., 2017). However, Sri Lanka has experienced water scarcity during the last three decades due to frequent variability in spatial and temporal water availability and extreme weather events (Chandrasekara, et al., 2021). Given there is no market-based allocation system for water, and no arrangements for full cost recovery for public provision of irrigation water, the nature of economic scarcity remains one of academic speculation. This problem is evident across South Asia.

### 3.5 Food supply

Out of the four dimensions of food security (availability, access, utilization and stability), food availability is mainly determined by the domestic food supply which is a factor of local food production, food imports and food exports.<sup>5</sup> This section explicitly examines local food production and in particular the relative shares of local production and imports and exports in South Asian countries from the local supply of food (Table 5).

India's local food production exceeds 100% of domestic supply in all commodity groups except vegetable oils (38%), tree nuts (68%) and pulses (93%). Similarly, imports as a percentage of total domestic supply are negligible in many commodity groups, with the notable exceptions of vegetable oils (65%) and tree nuts (49%). Similarly, in Pakistan, local production as a percentage of the total food supply is relatively high across several commodities including cereals, starchy roots, vegetables, fruits, meat, fish, milk and eggs. Imports are limited to those with inadequate local production such as pulses, tree nuts, oil crops, vegetable oils, spices and stimulants.

In Bangladesh, local production as a percentage of total supply is close to or above 100% in several food commodities including sugar crops, tree nuts, eggs, milk, meat, offal, stimulants and fish. Imports do not figure high in major commodity groups except sugar, pulses and oil crops. Local production as a percentage of total supply in Nepal is over 90% across several food commodities including cereals, starchy roots, vegetables, fruits, spices, stimulants, meat, offal, eggs and milk. Nepal imports 96% of the total supply of vegetable oil and over 50% of the total supplies of sugar, pulses and tree nuts are also imported.

In Sri Lanka, local food production as a percentage of domestic supply in stimulants, tree nuts, oil crops, sugar crops, fruits, meat, offal, milk and eggs exceeds 100% and exceeds 90% in cereals and spices. High levels of import dependency can be seen

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<sup>5</sup> *Domestic food supply = (local food production – food exports) + food imports – exports*

for vegetable oils (69%), spices (60%), stimulants (33%), animal fats (33%), fish (29%), cereals (27%) and starchy roots (26%).

Fish is the only product that is produced in significantly greater shares (244%) of the local supply in Maldives. All the other products are imported in significant proportions in Maldives. In Afghanistan, over 90% of the local supply of most food products including sugar crops, vegetables, fruits, spices, starchy roots, tree nuts, milk, offal and animal fats are produced domestically while the local production of sugar, pulses, vegetable oil and stimulants exceeds 100% from the total supply. In Bhutan, local production of starchy roots, sugar crops, tree nuts, oil crops, fruits, spices, offal and eggs exceeds 100% of the total supply while a major share of the total supply of cereals, sugar, pulses, vegetable oils and fish are sourced from imports.

Table 5: Share of local production and imports of food from local supply in South Asia (%)

	Afghanistan		Bangladesh		Bhutan		India		Maldives		Nepal		Pakistan		Sri Lanka		South Asia	
	Local (%)	Import (%)	Local (%)	Import (%)	Local (%)	Import (%)	Local (%)	Import (%)	Local (%)	Import (%)	Local (%)	Import (%)	Local (%)	Import (%)	Local (%)	Import (%)	Local (%)	Import (%)
<b>Cereals</b>	69	38	88	12	42	64	110	0	0	99	90	19	111	7	95	27	103	6
<b>Starchy Roots</b>	92	10	89	1	125	8	101	0	22	78	96	6	107	1	71	26	100	1
<b>Sugar Crops</b>	100	0	100	0	100	0	100	0	0	0	100	0	100	0	100	0	100	0
<b>Sugar &amp; Sweet</b>	0	135	29	90	56	88	105	7	0	100	62	64	119	7	21	102	96	18
<b>Pulses</b>	46	120	31	89	60	60	93	10	0	100	72	50	45	77	7	103	86	20
<b>Tree nuts</b>	97	33	147	15	113	0	68	49	25	75	54	54	66	40	313	5	79	39
<b>Oil crops</b>	78	36	27	87	100	0	101	1	0	100	55	49	56	45	111	1	89	13
<b>Vegetable</b>	103	7	89	11	86	18	102	0	8	92	96	4	95	12	81	20	102	2
<b>Vegetable Oil</b>	12	115	26	77	20	80	38	65	0	106	51	96	28	69	49	69	36	67
<b>Fruits</b>	115	22	88	15	117	6	101	1	19	84	91	11	108	3	102	5	102	2
<b>Stimulants</b>	0	113	97	6	0	0	136	11	0	100	192	15	0	122	1196	33	124	29
<b>Spices</b>	150	83	83	49	117	8	131	4	0	100	97	14	65	44	93	60	120	13
<b>Beverages</b>	0	300	0	71	110	2	102	9	0	100	161	2	559	0	98	9	110	9
<b>Meat</b>	87	12	99	1	58	33	115	0	0	100	100	0	115	0	100	1	109	1
<b>Offal</b>	95	7	98	2	100	0	127	0	0	0	100	0	102	0	100	0	109	0
<b>Animal fats</b>	91	11	92	8	67	0	101	0	0	100	99	0	100	0	67	33	100	0
<b>Eggs</b>	43	57	100	0	100	0	101	0	0	100	100	0	102	0	100	0	100	0
<b>Milk</b>	99	1	100	0	84	16	100	0	0	90	100	0	100	0	103	0	100	0
<b>Fish, Seafood</b>	71	29	95	7	4	97	114	1	244	11	85	15	143	3	76	29	108	4

Source: author's calculation based on FAOSTAT data Note: Local supply= (Local production + Imports)-(Stock variation + Exports)



Food exports play a significant role in the economies of many South Asian countries (Table 6). India is a major player in food exports, exporting various commodities such as rice, wheat, spices (like cumin, turmeric, and cardamom), tea, coffee, fruits (such as mangoes and bananas), and vegetables. Bangladesh exports food products like rice, fish, seafood and tea, as well as non-food products, jute. Pakistan's food sector exports include rice, sugar, fruits (such as mangoes and citrus fruits), and seafood. Cotton is an important agricultural commodity exported from Pakistan. The country is known for its high-quality Basmati rice, which is in demand in international markets.

Tea is one of Sri Lanka's most significant food exports, and the country is renowned for producing high-quality Ceylon tea. Other food exports from Sri Lanka include spices (like cinnamon and pepper), coconut products, and fruits. Agriculture is a dominant sector in Nepal's economy, with exports of tea, rice, cardamom, ginger, and medicinal herbs contributing to the country's trade. Agriculture is the mainstay of Bhutan's economy, and the country exports products such as cardamom, fruits like apples and oranges, potatoes, and vegetables. Maldives exports fish and fisheries products, including canned tuna, which is a significant contributor to the country's economy.

**Table 6: Share of exports from local production of food in South Asian countries (%)**

	Afghanistan	Bangladesh	Bhutan	India	Maldives	Nepal	Pakistan	Sri Lanka
<b>Starchy roots</b>	2.34	0.41	24.69	0.80	0.00	0.00	7.76	6.12
<b>Sugar Crops</b>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Sugar</b>	33.33	8.00	77.78	22.55	0.00	21.86	17.09	8.50
<b>Pulses</b>	140.91	0.21	0.00	1.67	0.00	2.53	0.00	150.00
<b>Tree nuts</b>	34.43	0.00	0.00	15.67	0.00	0.00	2.63	84.43
<b>Oil crops</b>	5.26	1.35	0.00	2.63	0.00	0.00	0.97	8.39
<b>Vegetable</b>	0.00	21.34	0.00	11.46	0.00	79.93	0.30	26.35
<b>Vegetable oil</b>	9.40	0.16	4.17	2.13	0.00	0.19	6.52	1.91
<b>Fruits</b>	24.12	0.51	16.07	1.14	0.00	0.00	10.30	5.45
<b>Stimulant</b>	88.89	2.36	0.00	20.06	0.00	4.52	9.05	28.80
<b>Spices</b>	0.00	0.00	0.00	13.15	0.00	0.00	1.93	0.79
<b>Beverages</b>	0.00	0.00	0.00	21.60	0.00	0.00	1.81	0.00
<b>Meat</b>	0.00	0.00	0.00	1.10	0.00	0.00	0.00	0.00
<b>Offal</b>	0.00	0.00	0.00	0.73	0.00	0.00	2.48	0.00
<b>Animal fats</b>	0.00	0.25	0.02	0.04	0.00	0.00	0.02	0.59
<b>Eggs</b>	0.00	1.83	0.00	12.90	63.60	0.09	32.11	7.19
<b>Milk</b>	0.00	0.00	0.00	1.14	0.00	0.00	0.00	24.00
<b>Seafood</b>	0.15	0.12	0.00	7.72	0.00	0.07	14.34	2.94

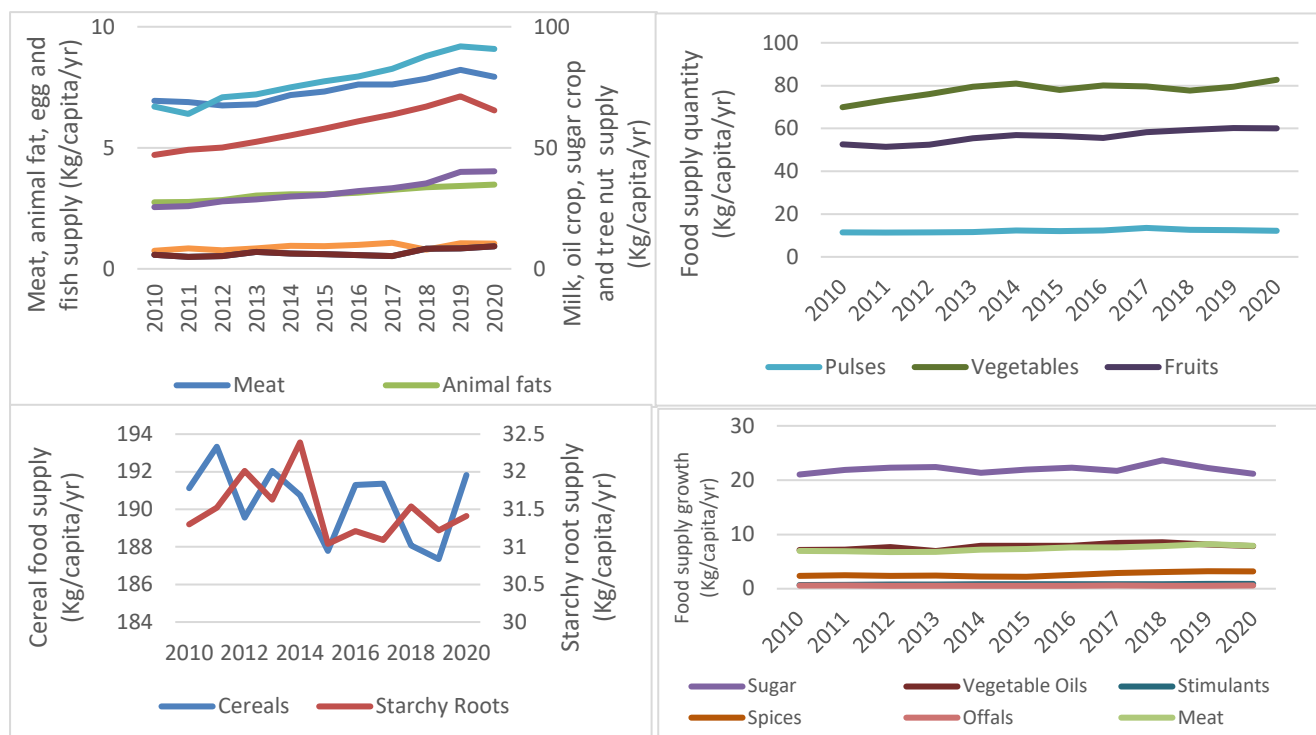
Source: authors' calculation based on FAOSTAT data (FAO, 2023)

### 3.6 Food demand and access to food

The population of South Asia has increased by 13% from 1,736 million in 2010 to 1970 million in 2020, with income increasing by 36% from USD 1,492 per capita to USD 2,031 per capita. Hence, the demand for food increased modestly in terms of average food supply quantity (kilogram) per capita per annum (Figure 17). Notably, the most remarkable increase in consumption has come from oil crops, eggs, sugar crops, milk, tree nuts and fish, with the average per capita food supply increasing by 6.53%, 4.74%, 4.49%, 3.44%, 3.24% and 3.16% annual growth from 2010-2020.

Whereas, in the case of cereals and starchy roots, the change has been fluctuating sharply with the average per capita food supply increasing just by 0.05%. The growth of the food supply of vegetables (1.74%), fruits (1.37%) and pulses (0.82%) showed a modest growth rate. This growth, notably in food items with high-income elasticity of demand, is largely a result of income growth in the region.

**Figure 17: Food supply quantity (kg/capita/yr) 2010-2020**

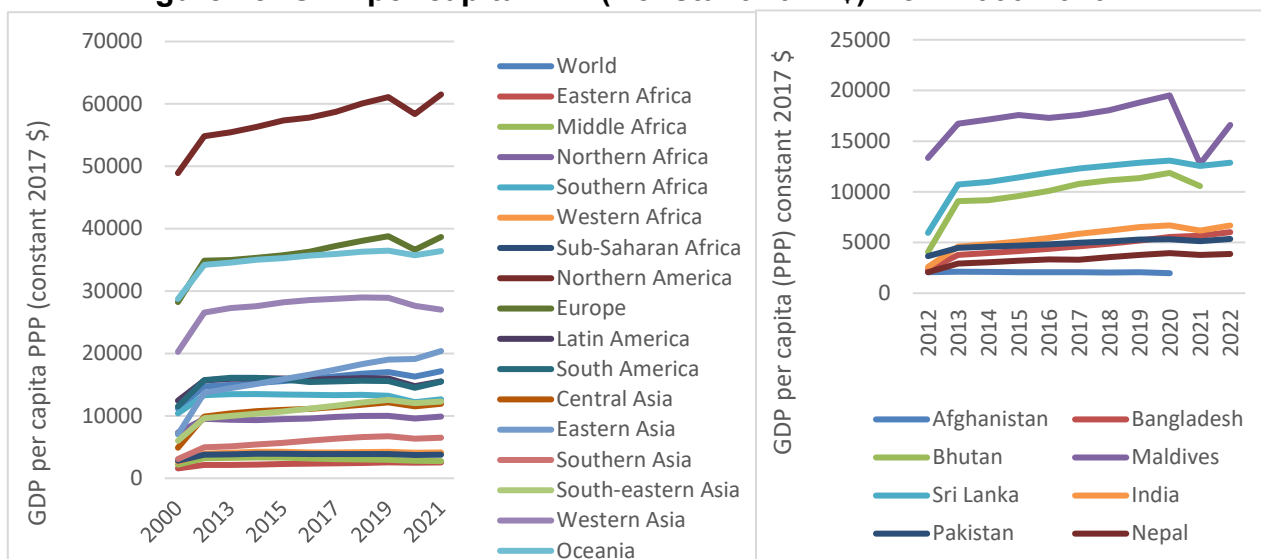


Source: authors' calculation based on FAOSTA data (FAO, 2023)

Access refers to the capability of households to obtain an adequate diet of appropriate food by having sufficient income or other resources to purchase such necessities. It is connected to household demand for various types of food in relation to their prices and physical accessibility (road and transport infrastructure) as well. Access to food can be measured by indicators such as gross domestic product per capita (in purchasing power equivalent), the domestic food price index, and the prevalence of undernourishment and prevalence of food insecurity. The GDP per capita PPP is used as an indicator of changes in financial access to food in a country or a region. For this

indicator, South Asia's performance is less than that of many regions/ sub-regions. South Asia (\$ 6,484) is better than only Middle Africa (\$2,764), Eastern Africa (\$2,538), Sub-Saharan Africa (\$3,803) and Western Africa (\$4,154) (Figure 18). There is a significant variability in the country-level GDP per capita PPP as well. In general, GDP per capita PPP is in an increasing trend during the last two decades in the South Asian region except in Afghanistan where there is a stagnation of GDP per capita PPP. Afghanistan has the lowest GDP per capita PPP too (\$ 1,971). Maldives (\$16,596) has the highest GDP per capita PPP followed by Sri Lanka (\$12,859).

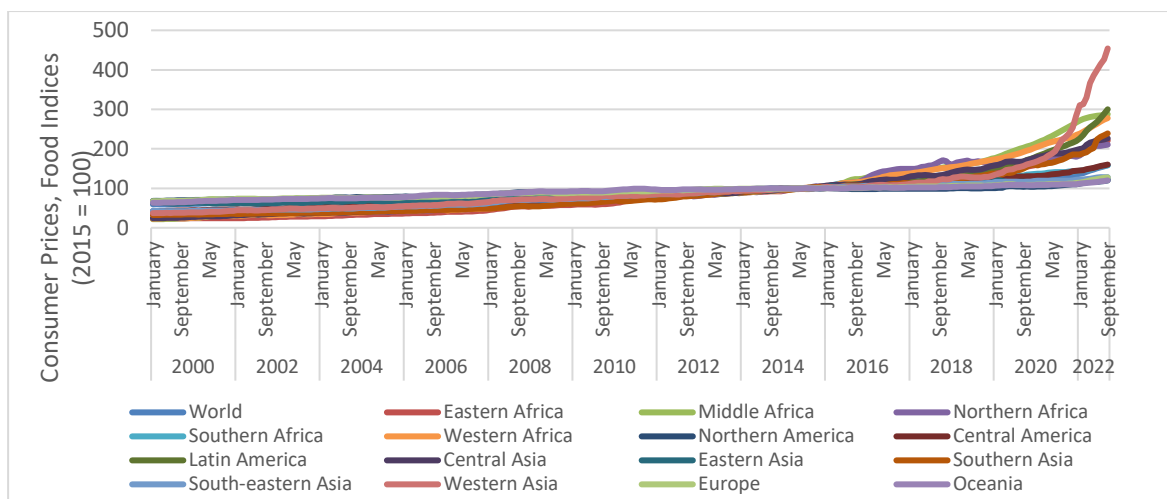
**Figure 18: GDP per capita PPP (Constant 2017 \$) from 2000-2020**



Source: authors' calculation based on FAOSTAT data (FAO, 2023)

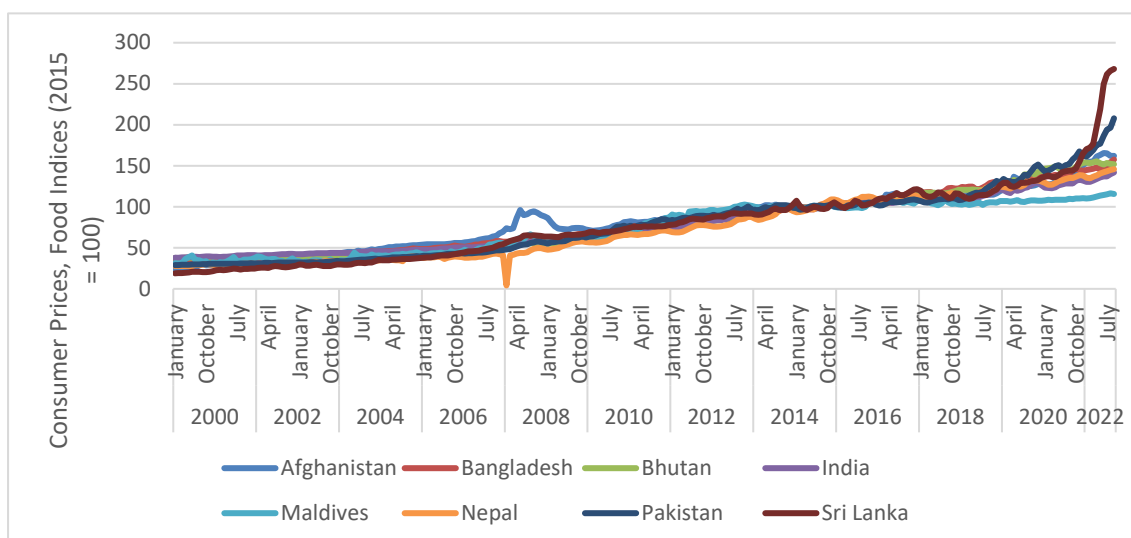
The consumer price index for food is an important indicator for monitoring access to food across countries. It measures the changes in price level between the current and reference periods for an average basket of food purchased by households. Hence it is used as a tool to compare relative food prices over time and across countries/ regions. South Asia's consumer price index for food (239) is higher than all other countries except Western Asia (454), Latin America (299), Middle Africa (278) and Western Africa (274) (Figure 19). At the disaggregated level, Sri Lanka (268) has the highest consumer price index followed by Pakistan (208). Maldives (115) has the lowest consumer price index followed by India (142) and Nepal (146) (Figure 20).

**Figure 19: Consumer prices, food indices (2015 = 100) in different regions**



Source: authors' calculation based on FAOSTAT data (FAO, 2023)

**Figure 20: Consumer prices, food indices (2015 = 100) in South Asia**



Source: authors' calculation based on FAOSTAT data (FAO, 2023)

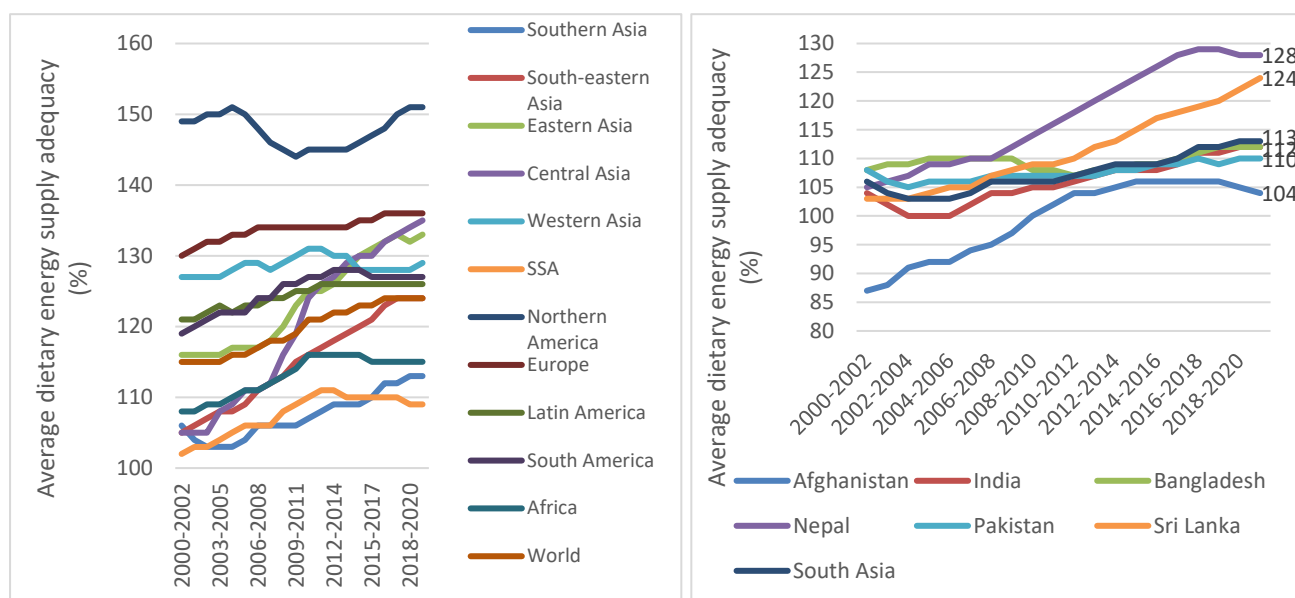
### 3.7 Utilization of food

Food utilization refers to the nutritional outcome of individual consumption of food and is determined by the level of availability, household access and intra-household distribution of food. This section further analyses whether undernourishment is mainly due to inadequate food supply, unequal distribution, or poor affordability of food among segments of the population. Average dietary energy supply adequacy (ADESA)<sup>6</sup> mainly reveals whether food is sufficiently available to meet the calorie requirement of

<sup>6</sup> Average dietary energy supply adequacy (ADESA) measures the dietary energy supply in a country as a percentage of the average dietary energy requirement (ADER) for the total population. If the indicator is 100 its supply is equal to its requirement. If it is less than 100, then food supply of country is inadequate to meet the population's calorie requirements of its population. If it is higher than 100 then the country's food supply is adequate. Since this indicator is based on the food balance sheets, it adjusts for wastage, losses and buffer stock requirements.

the population of a country or a region. For this indicator, South Asia's sufficiency (113) is higher than that of only Sub-Saharan Africa (109), but less than all other regions (Figure 21). This shows calorie supply in South Asia may be adequate for all consumers if food could be distributed according to the requirements of individuals since the calorie supply is 13% higher than what is required. However, there is significant variability in the average dietary energy supply adequacy of individual countries in the region. Nepal and Sri Lanka have performed well over the last 2 decades while Afghanistan has performed poorly during the last decade after performing well in the preceding decade. The performance of India (112), Bangladesh (112) and Pakistan (110) have been average over the last 2 decades. Nepal (128) and Sri Lanka (124) have 28% and 24% more caloric supply than the populations of the countries demand while Afghanistan has a mere 4% more caloric supply than its population demands.

**Figure 21: Average energy supply adequacy (%) in South Asian countries**



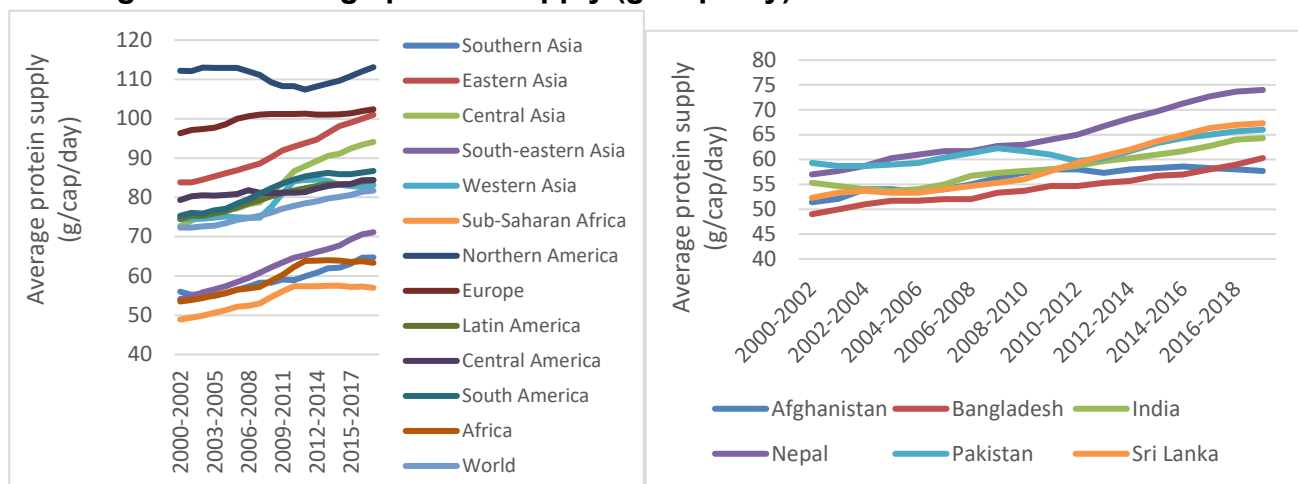
**2000-2020**

Source: authors' calculation based on FAOSTAT data (FAO, 2023)

The average protein supply (APS) is an indicator of the quality of the food supply available in a country. There is concern about protein malnutrition among the population, especially children and women in South Asia. APS per capita in South Asia (64.7 g/capita/day) is lower than all regions, except Africa (63.3 g/capita/day) and SSA (57 g/capita/day) (Figure 22). Northern America (113.1 g/capita/day), Europe (102.4 g/capita/day) and Eastern Asia (101 g/capita/day) have the highest APS. Similar to ADESA, there is significant variability in the APS of individual countries in the region. Nepal (74 g/cap/day) has the highest APS followed by Sri Lanka (67.3 g/cap/day) and Pakistan (66 g/cap/day). The lowest APS can be seen in Afghanistan (57.7 g/cap/day) followed by Bangladesh (60.3 g/cap/day). All countries except Afghanistan and Pakistan have shown an increasing trend in APS during the last decade. Afghanistan

has performed poorly during the last decade after a satisfactory performance in the preceding decade, while the performance of Pakistan is mixed with an increasing trend of APS during the last 5-6 years.

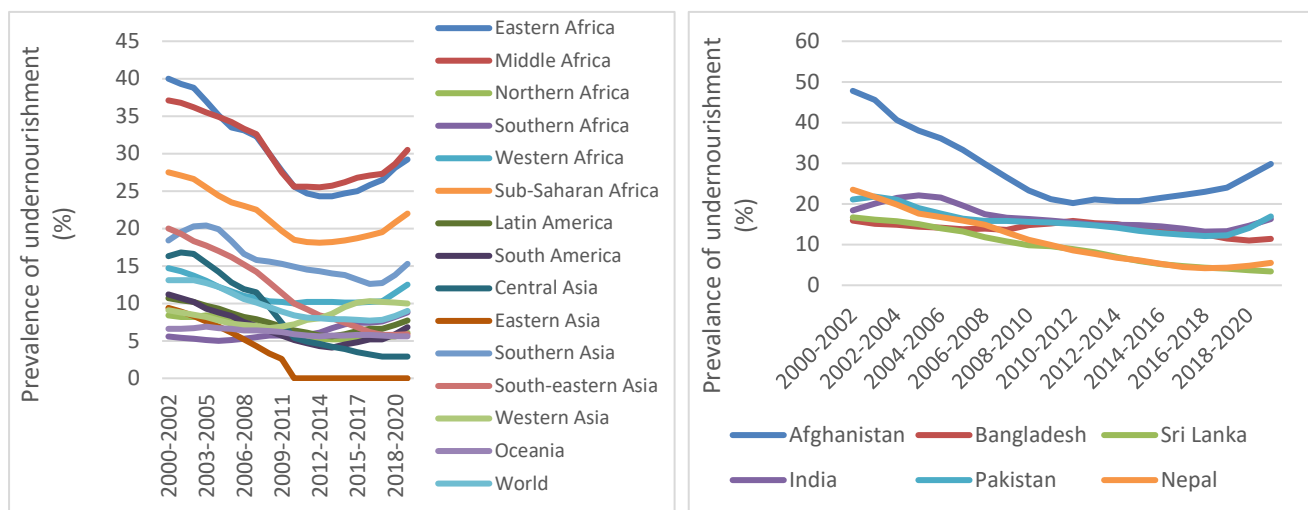
**Figure 22: Average protein supply (g/calp/day) in South Asia 2000-2020**



Source: authors' calculation based on FAOSTAT data (FAO, 2023)

The prevalence of undernourishment is an indicator of chronic food deprivation or hunger and shows the percentage of the population that does not consume an adequate quantity of calories to maintain a normal and healthy life. For this indicator, South Asia's performance is lower than that of many of the regions/ sub-regions. South Asia (where 15.3% of the population is undernourished) is better than only Middle Africa, Eastern Africa, and Sub-Saharan Africa (Figure 23). Even Western Africa, Northern Africa, Southern Africa and all the other sub-regions in Asia are better than South Asia. There is significant variability in the country-level prevalence of undernourishment as well. In general, the prevalence of undernourishment has been in a declining trend during the last 2 decades in the region. Afghanistan is an exception since it shows a stagnating trend from 2010-2015 and thereafter a gradual increase in undernourishment. Sri Lanka shows a gradual decline in undernourishment throughout while the rest of the countries show a gradual increase in undernourishment since the 2018-2019 period.

**Figure 23: Prevalence of undernourishment (%) in South Asian countries 2000-**

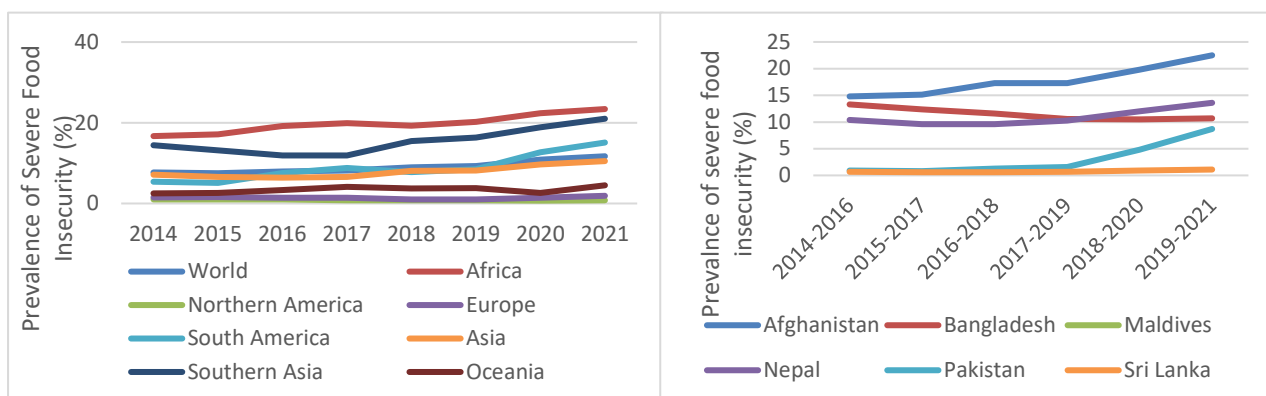


**2020**

Source: authors' calculation based on FAOSTAT data (FAO, 2023)

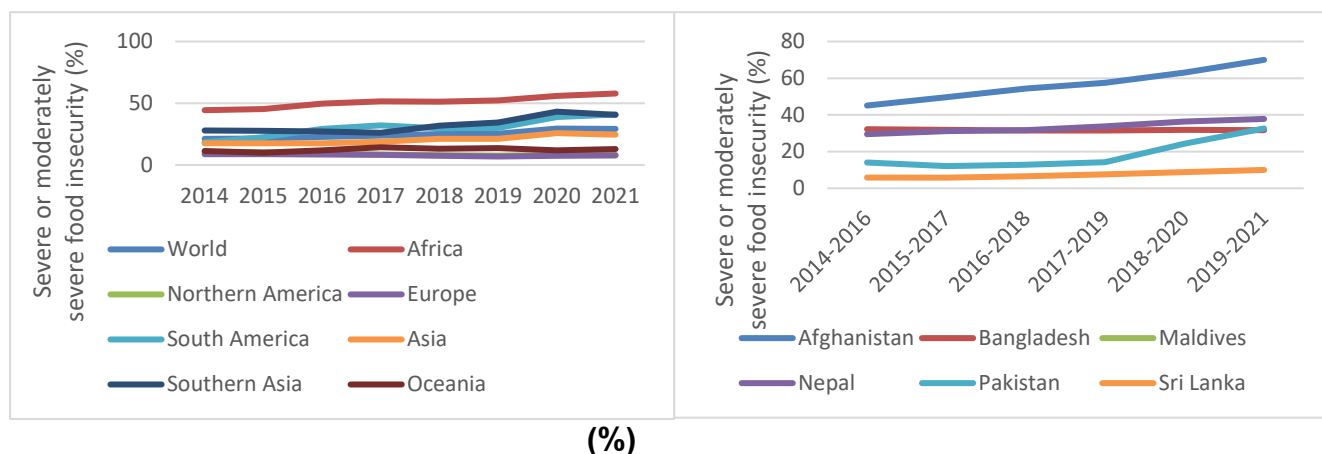
According to recent estimates, 11.7% of the world's population (927 Mn people) was at risk of severe food insecurity in 2021 (Figure 24). Of those who suffered from severe food insecurity 125 million people lived in Africa, and 120 million lived in South Asia alone. This indicates a 21% prevalence of severe food insecurity in the region with Afghanistan (22.5%) with the highest prevalence followed by Nepal (13.5%) Bangladesh (10.7%) and Pakistan (8.7%). Sri Lanka (1.1%) has the lowest prevalence of severe or moderate food insecurity followed by Maldives (2.2%). When moderately severe food insecurity is also added, the South Asian region has a 41% prevalence of severe or moderately severe food insecurity. Afghanistan (70%) has the highest prevalence followed by Nepal (38%), Pakistan (31%) and Bangladesh (32%) (Figure 25). Sri Lanka (10%) has the lowest prevalence of severe or moderately severe food insecurity followed by the Maldives (13.4%). A consistent lack of sufficient and nutritious food due to food insecurity is associated with adverse dietary and health outcomes such as hunger and malnutrition in both adults and children.

**Figure 24: Severe food security prevalence in South Asia (%)**



Source: authors' calculation based on FAOSTAT data (FAO, 2023)

**Figure 25: Severe or moderately severe food security prevalence in South Asia**



Source: authors' calculation based on FAOSTAT data (FAO, 2023)

### 3.8 Food supply stability

Stability deals with the capacity of the food system to withstand short-, medium- and long-term shocks (including economic, social, environmental or political vulnerabilities) ensuring the availability, access, and utilization of food at all times to all households and individuals. Recent examples of such shocks include COVID-19 (Box 1), the Ukraine war (Box 2) and climate change. The ability of food stability to withstand such shocks can be shown by indicators such as the value of food imports over total merchandise exports, domestic food price volatility and per capita food supply variability.

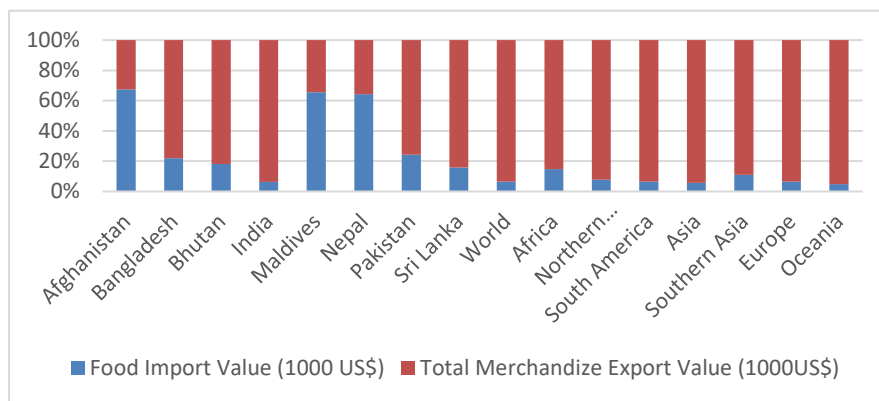
The value of food imports over total merchandise exports measures the sufficiency of export earnings to pay for food imports or self-reliance on food. While the South Asian region has the ability to pay for food imports with its total merchandise exports (12%), its capacity is better than only Africa (17%) (Figure 26). All the other regions have food import value of less than 8% of the total merchandise exports. At the country level, India is better positioned with respect to this indicator. It shows that the value of food imports is only 7% of the total merchandise exports whereas in countries such as Afghanistan, the Maldives and Nepal, the values of food imports are 108%, 90% and 80% higher than the total merchandise export earnings showing greater risk and instability. The values of food imports as a proportion of total merchandise exports for Sri Lanka, Bhutan, Bangladesh and Pakistan are 19%, 22%, 28% and 32% respectively. Even though countries such as Sri Lanka and Bhutan are better able to finance food imports through export earnings, they are excessively dependent on limited export products and more diversified imports, indicating an area of vulnerability.

Sri Lanka has exhibited these vulnerabilities during its worst economic crisis in modern history (Mallawaarachchi & Quiggin, 2022). Progress in achieving further improvements in food security in the region and Sri Lanka in particular, will depend on the success of government attempts to bring back market stability, stimulate the



growth process and safeguard the poor and vulnerable through effective social safety nets.

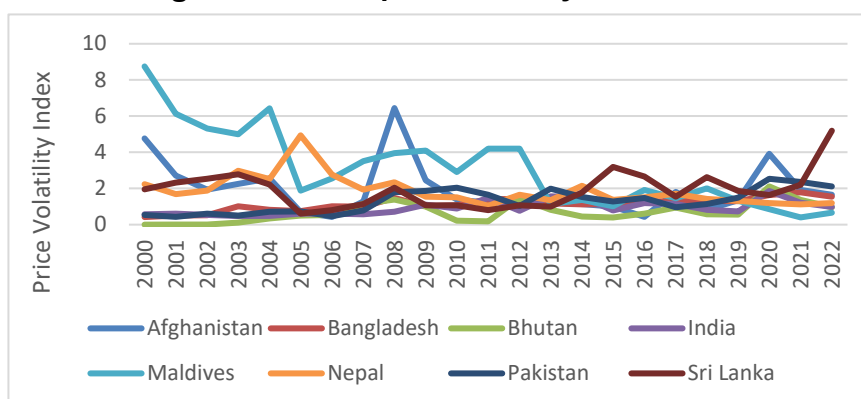
**Figure 26: Relative percentages of food import values and total merchandise exports in South Asia in 2021**



Source: authors' calculation based on FAOSTAT data (FAO, 2023)

The domestic food price volatility index measures the variability in the relative food prices in a country. Monthly price indices were used to calculate month-on-month growth rates with the standard deviation of the growth rates being measured over the previous 12 months. The average of these standard deviations over 12 months for each year is presented as the annual volatility index. Domestic food price volatility has been lower in India and Bhutan compared to the other South Asian countries over the last two decades (Figure 27). As indicated earlier, public outcry over higher prices, consumer activism in addition to the fairly efficient level of PDS in India help in reducing price volatility. Domestic food price volatility has been highest in Sri Lanka in recent years followed by Pakistan and Afghanistan.

**Figure 27: Food price volatility in South Asia**



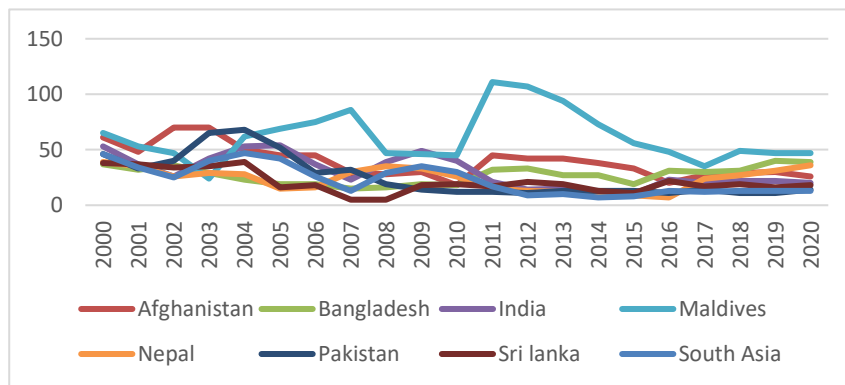
Source: authors' calculation based on FAOSTAT data (FAO, 2023)

Per capita food supply variability<sup>7</sup> is much higher in Maldives (47 kcal/capita/day), Bangladesh (39 kcal/capita/day) and Nepal (36 kcal/capita/day) compared to all other

<sup>7</sup> Per capita food supply variability for a specific year is measured as the standard deviation of the per capita food supply over the previous 5 years.

South Asian countries (Figure 28). The higher per capita food supply variability in the Maldives and Nepal can be attributed to the fact that food import dependency is higher in these countries while the local agricultural production is low. The higher per capita food supply variability in Bangladesh is because agricultural production is mainly monsoon-dependent. Pakistan (14 kcal/capita/day) has the lowest supply variability followed by Sri Lanka (18 kcal/capita/day) and India (20 kcal/capita/day). These countries show relatively lower food import dependency and greater domestic production. In almost all countries, per capita, food supply variability has shown a declining trend during the last two decades mainly due to improved technology which has reduced the impact of climate variability on crop production, especially in countries such as India, Pakistan and Sri Lanka. However, the recent increase in supply variability might be due to the high frequency of extreme weather events including floods and droughts during recent years (2016-2017 in Sri Lanka) and COVID-19 (in 2020).

**Figure 28: Per capita food supply variability in South Asia (kcal/capita/day)**

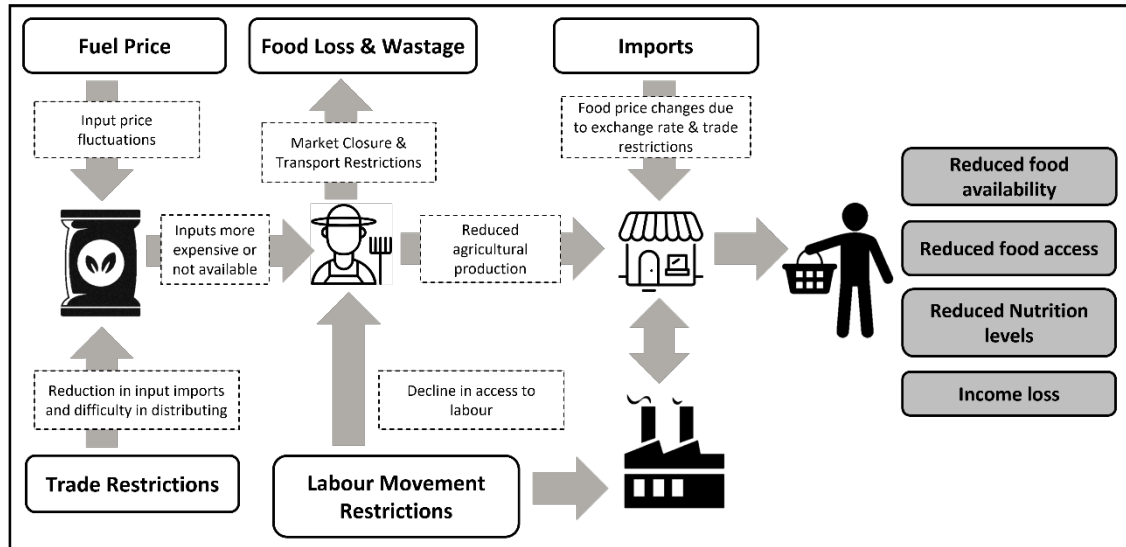


Source: authors' calculation based on FAOSTAT data (FAO, 2023)

### Box 1: Food system vulnerabilities during COVID-19

The COVID-19 pandemic affected all elements of the food system, from production to final consumption including trade and logistics systems. It also affected factor markets such as labour and capital and macroeconomic factors, such as exchange rates and fuel prices. The Figure 29 illustrates the main avenues and their links through which the impacts of COVID-19 affected the food systems in the region.

**Figure 29: Graphical illustration of food system vulnerabilities due to COVID-19**



COVID-19 lockdown measures highlighted the vulnerability of global food systems to disruptions. Even though food supplies were adequate in the local market, the measures adopted to contain the pandemic – such as restricted transport and storage facilities, and closure of major wholesale and retail markets – caused major disruptions to food supply chains, raising concerns about people’s access to food – particularly in poor and marginalized households. These issues added to the difficulties faced by the urban poor and those employed in the informal economy, especially daily wage earners who lost wages income. Also, food insecurity prompted panic buying to store essential food as an emergency measure during the pandemic and contributed to rising food prices of both domestically produced and imported food items.

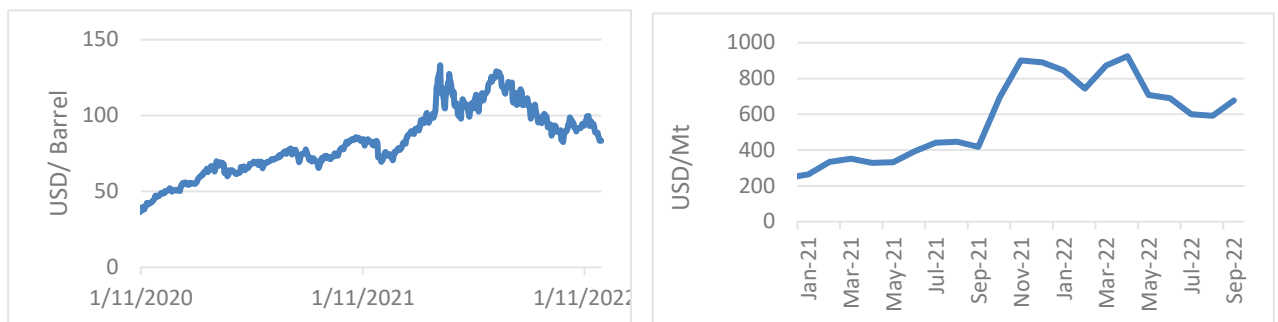
Direct impacts of COVID-19 on agriculture were limited, as the virus does not affect the natural resources upon which production is based. However, constrained labour movements due to mobility restrictions associated with COVID-19 posed a threat to food security and livelihoods initially, since agricultural production systems in the region are more labor-intensive. Moreover, restricted access to agricultural inputs such as fertilizer and seeds and a lack of support services and infrastructure affected food production. Increased food loss and wastage due to the closure of regional wholesale markets to control the spread of COVID-19, added further to losses suffered by farmers who were already impacted by low prices.

Source: Thibbotuwawa (2020).

## Box 2: Risks of the Ukraine war on food systems

Most South Asian countries are net food, fertilizer and fuel-importers. Therefore, the impact of the war in Ukraine came primarily through fuel, fertilizer and food price impacts. Price hikes made headlines with crude oil prices soaring following Russia's invasion of Ukraine in February 2022. Immediately after the Russian invasion on 24 February, the Brent spot price crude oil per barrel reached the historical high of USD 133 on 08 March with a staggering 34% rise following the invasion (Figure 30). The oil price shock led to a considerable worsening economic situation in South Asian given it affected several key sectors. Fertilizer prices surged dramatically as did urea prices which increased to an all-time high of USD 925/MT in April 2022 from less than USD 300/MT before 2021.

**Figure 30: Fluctuation of Brent crude oil and urea prices**

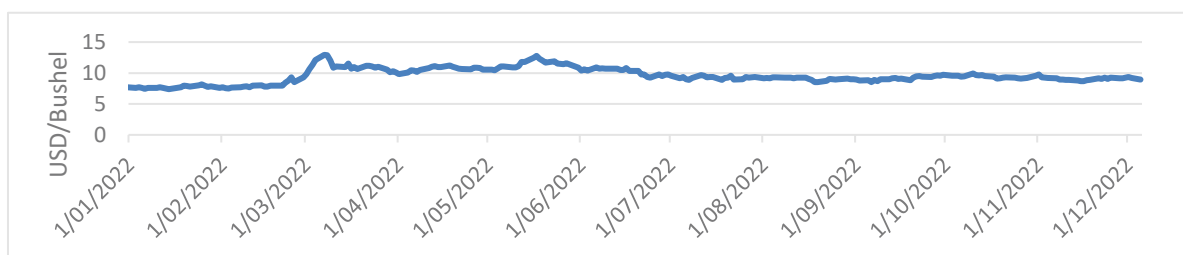


Source: Macrotrends 2022. Brent Crude Oil Prices-10-year

daily chart. <https://www.macrotrends.net/2480/brent-crude-oil-prices-10-year-daily-chart> Urea  
<https://www.indexmundi.com/commodities/?commodity=urea&months=360>

Therefore, the volatility of global oil prices, rising international food and intermediate input prices and high logistics costs, coupled with the compounded impact of a steep currency depreciation have contributed to food price increases. As a result, food and fertilizer export restrictions were instituted in a number of countries. Such measures increased global prices further and had serious consequences for vulnerable people in food-importing countries such as Sri Lanka which was already affected by the COVID-19 pandemic. The cost of wheat reached its historical highest point of USD 12.94 per bushel on 07 March 2022, up 47% from the day before the invasion (Figure 31).

**Figure 31: Fluctuation of wheat prices**



Source: Macrotrends 2022. Wheat Prices-10-year daily chart. <https://www.macrotrends.net>

Also, currency depreciation and weaker exchange rates have now added extra pressure on consumer prices. The severe macroeconomic crisis with weaker exchange rates, high inflation, reduced tourism and remittances incomes and debt default have already caused acute shortages and spikes in the prices of essential products, including food, fertilizer and fuel causing major disruptions to agricultural production and rural livelihoods in South Asian economies (Thibbotuwawa, et al., 2023).

### 3.9 Agricultural trade

By the late 1970s, South Asian countries began liberalising trade and opening their economies to the global market, albeit with reservations. As elsewhere in the region, Sri Lanka had an inward-looking trade policy before 1977. Import controls were imposed to support import substitution industrialisation and stringent exchange controls were required to manage the scarce reserves. After the political changes in 1977, Sri Lanka took the initiatives for liberalisation, which included trade liberalisation, currency devaluation, partial liberalisation of financial markets and targeting domestic food subsidies. As shown in Figure 32, Sri Lanka's trade openness dramatically increased in the early eighties<sup>8</sup>. Sri Lanka embarked on a second wave of liberalisation, focusing on stabilisation, which was completely lacking in the first wave. Programmes to reduce the budget deficit and bring down inflation and ambitious privatisation programs were major features of the second wave of liberalisation (Kelegama, 2006).

The step-by-step liberalisation path was common in many South Asian countries. However, initial liberalisation episodes were “half-hearted” or left an “unfinished agenda” (Lal & Rajapathirana, 1989; Panagariya, 2004). Panagariya (2004) discusses the 1980s and early 1990s reforms of India, which significantly increased India's trade openness resulting in a substantial growth effect. A brief review of liberalisation attempts of South Asian countries is given in table A1 in the appendix.

The successive liberalisation episodes since the early 1980s had increased South Asian economies' openness, and a continuous increase could be seen until the global financial crisis (GFC) in 2007-08. Electoral changes, including Brexit and the US presidential election in 2016, exacerbated a downtrend in global trade. Yet, a consensus on pursuing globalisation of trade as the key driving force of economic growth remained with data showing no global scale decoupling but rather a slow-down in growth (Antràs, 2020). Global trade, capital, and labour flows proved resilient to multiple crises with only a slight slowing down of growth. However, recent profound policy changes in the largest economies in the world, which once were the pioneers in lowering tariffs and global integration, suggest that the future of the global trade system will be influenced more by geopolitical interests and rising costs of transport and logistics than a concerted push for globalisation. Regional trade is likely to grow, as is trade in high-value commodities that are attractive to a growing middle class.

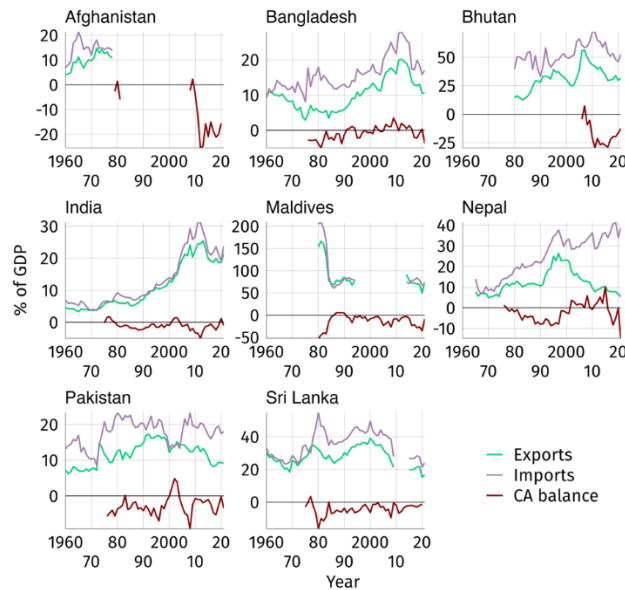
However, concerns arose over globalisation with the increased import competition from low-wage countries and associated labour market effects in developed countries, including the US (Autor, et al., 2011; Autor, et al., 2014; Autor, et al., 2016). None of

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<sup>8</sup> *The plunge of trade openness in the mid-1980s was a result of massive public investment driving the growth of the non-tradeable sector of the economy. Massive Keynesian-style fiscal injection by way of infrastructural investment was initiated by Sri Lanka in 1982. Kelegama (2006) identified three “lead projects” of the government, i.e., the free trade zone, Accelerated Mahaveli Development Project (AMDP) and a public housing scheme. Among them, the fiscally large and politically spectacular AMDP project had an estimated cost of 860 USD million in 1980.*

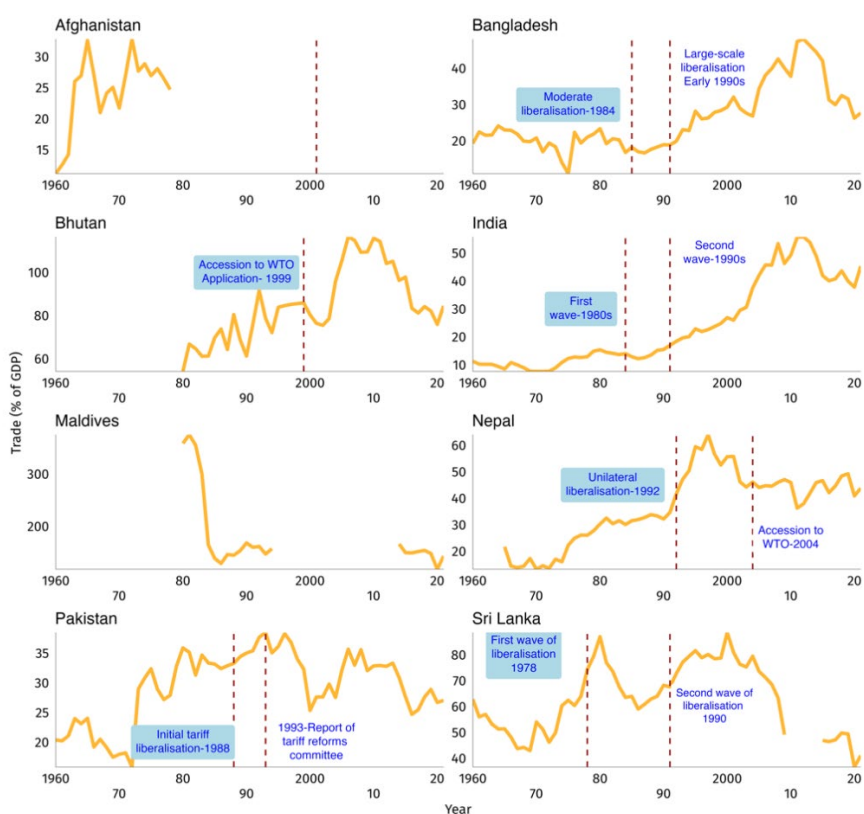
them could permanently damage global trade. However, recent policy actions based on national security in the aftermath of Russia's Ukraine invasion may not bode well with the globalised world order. Export restrictions to hamper China's technological growth, supply chain diversification away from hostile countries, US security strategy and the CHIPS Act have the capability of ushering in a new era of inward-looking economies (Goldberg & Reed, 2023).

**Figure 32: Historical exports, imports, and current account balance data for the South Asian countries 1960-2021**



Source: authors' illustration using WDI data

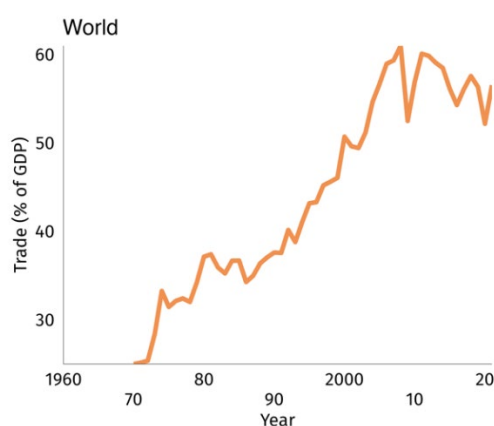
**Figure 33: Openness, trade as a percentage of GDP, of South Asian countries 1960-2020**



Source: authors' illustration using WDI data and various other sources.

As elsewhere, South Asian countries have also experienced a slowdown in the tradable component of their economies (Figure 33). The world trade openness pattern shows that the golden era of globalisation – early 1980 to late 2000s- which witnessed hyper-globalisation, is over and the aftermath of multiple shocks in 2007 has further slowed down progress (Figure 34). India, the major economy of South Asia, is also experiencing a slowdown in trade openness after the major achievements resulting from two waves of trade liberalisation. India swiftly reverted to the pre-GFC crisis trend line of trade openness but has not recovered from a recent slowdown. The slowdown is stark in Bangladesh, Bhutan and Sri Lanka. Sri Lanka had a trade-based economy in the 1950s before it embarked on an IS growth strategy. The IS era reversal of trade openness was more than compensated by swift increases after two waves of trade liberalisation in 1977/78 and the 1990s. However, around 2005 Sri Lanka's trade openness began to fall rapidly.

**Figure 34: Global trade openness: 1970-2021**



Source: authors' illustration using WDI data

Sri Lanka's reversal of trade openness lies in the expansion of the non-tradable sector after 2009, which marked the end of thirty years of civil war. The infrastructure boom, funded mainly through Chinese loans, increased the non-tradable sector of the economy, boosting growth remarkably (Weerakoon, et al., 2019). Multiple factors, including loan-funded infrastructure, which had little economic return, deficit financing through borrowing from capital markets and fiscal mismanagement, plunged the country into the worst economic crisis it had faced post-independence.

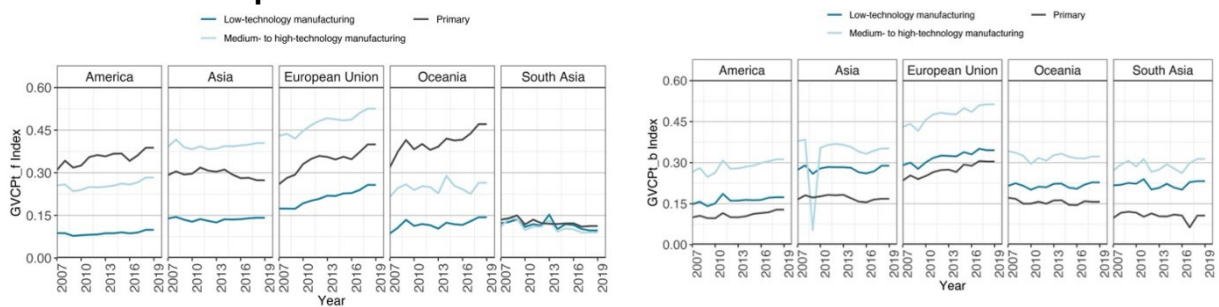
The slowdown in South Asia and Sri Lanka's reversal of trade openness should be analysed in light of the global development of decoupling. The relocation of crucial semiconductor manufacturing supply chains based on security reasons and renewed policy targeting dual-purposed goods indicate a disruptive future for global value chain participation. South Asia's future economic growth depends on successfully integrating into value chain activities. South Asia's GVC participation is already low, and the region's trade agreements have failed to boost GVC participation (Box 4). Consequently, a move to decoupling from GVCs and inward-looking trade policies by large economies inevitably poses a challenge to the region's future growth prospects.



**Box 3: Trade policy and global value chain participation by South Asian countries: a failed attempt**

South Asia’s GVC participation is relatively low compared to the other regions worldwide. Empirical studies show that even African countries, which are at a nascent stage of economic growth, participate in agricultural and food GVC (Balié et al., 2019). In contrast, South Asia’s GVC participation is low in both forward and backward linkages. Backward linkages are relatively higher compared to forward linkages. This might be due to low-tech manufacturing, such as ready-made garment production, which uses foreign input. The role of low tariffs and lowering trade costs through FTAs are empirically proven (Balié et al., 2019).

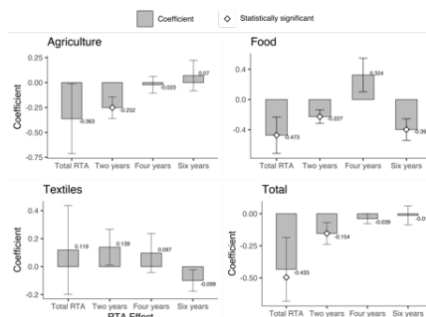
**Figure 35: Forward and backward GVC participation index for selected countries: a South Asian comparison**



Source: Wijesinghe & Yogarajah (2022)

However, empirical evidence shows that South Asia’s regional trade agreements (RTAs) have a trivial effect in boosting GVC participation. Wijesinghe & Yogarajah (2022b) show that RTAs even have a depressing impact on GVC activities relating to South Asian regional agricultural and food trade. The depressing impact can be explained given the region’s RTAs have notorious long sensitive lists, restrictive rules of origin and prolonged phasing-in.

**Figure 36: Effect of RTAs on backward GVC participation and phasing-in effect of RTAs**

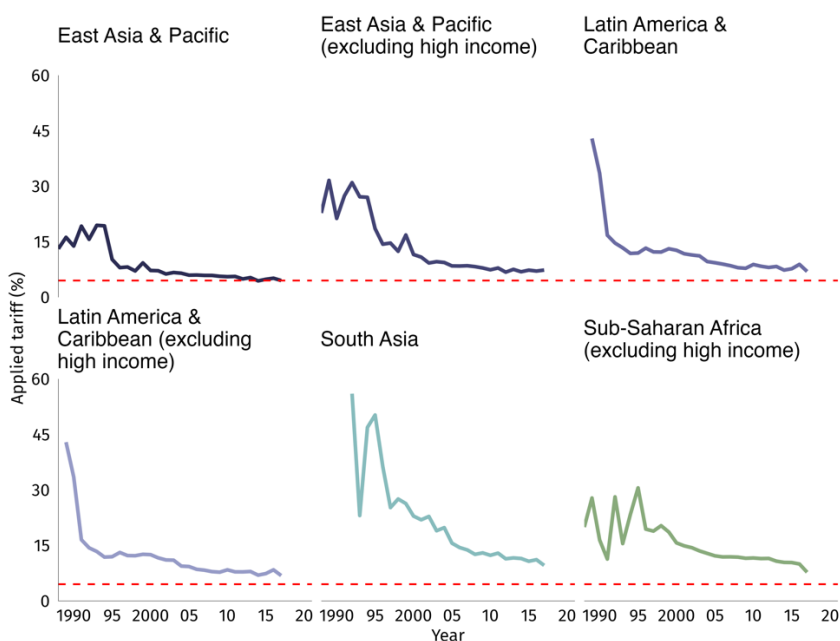


Source: Wijesinghe & Yogarajah (2022).

After several liberalisation attempts, joining the WTO, and tariff cuts following the Uruguay round, South Asian countries had significantly reduced tariffs. Figure 37 compares the applied tariff levels across different regions. The broken line represents the tariff level of East Asia and the Pacific in 2021. South Asia's tariff level is slightly above East Asia but comparable with Sub-Saharan and Latin American regions. The share of tariff lines with more than 15% tariffs is lower in South Asia compared to Sub-Saharan Africa (Figure 38). Country-specific tariff reduction over time is shown in Figure 39.

As Kelegama (2006) noted, Sri Lanka bound all its agricultural tariffs below 50% to lock in its liberalisation policies with the Uruguay Round Table Agreement on Agriculture. The intention was to develop the agriculture sector in Sri Lanka based on comparative advantage. However, the practice of subsidies, non-tariff barriers, and restrictive trade policies by trade partners was a constraint. In addition, trade policy related to agriculture was highly ad-hoc as periodic changes were required to achieve the dual objectives of protecting domestic producers and alleviating domestic shortages in the off-season<sup>9</sup>.

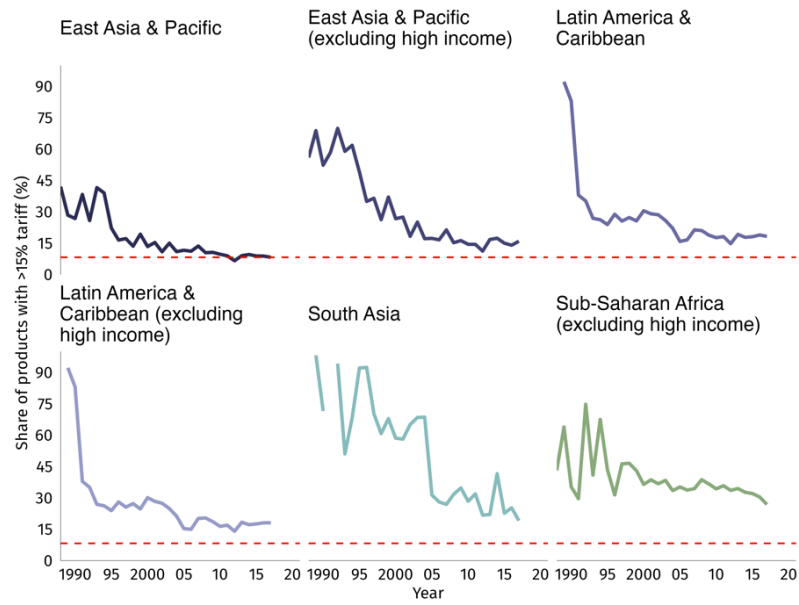
**Figure 37 Applied tariff rates of South Asia and selected other regions.**



Source: authors' illustration using WDI data

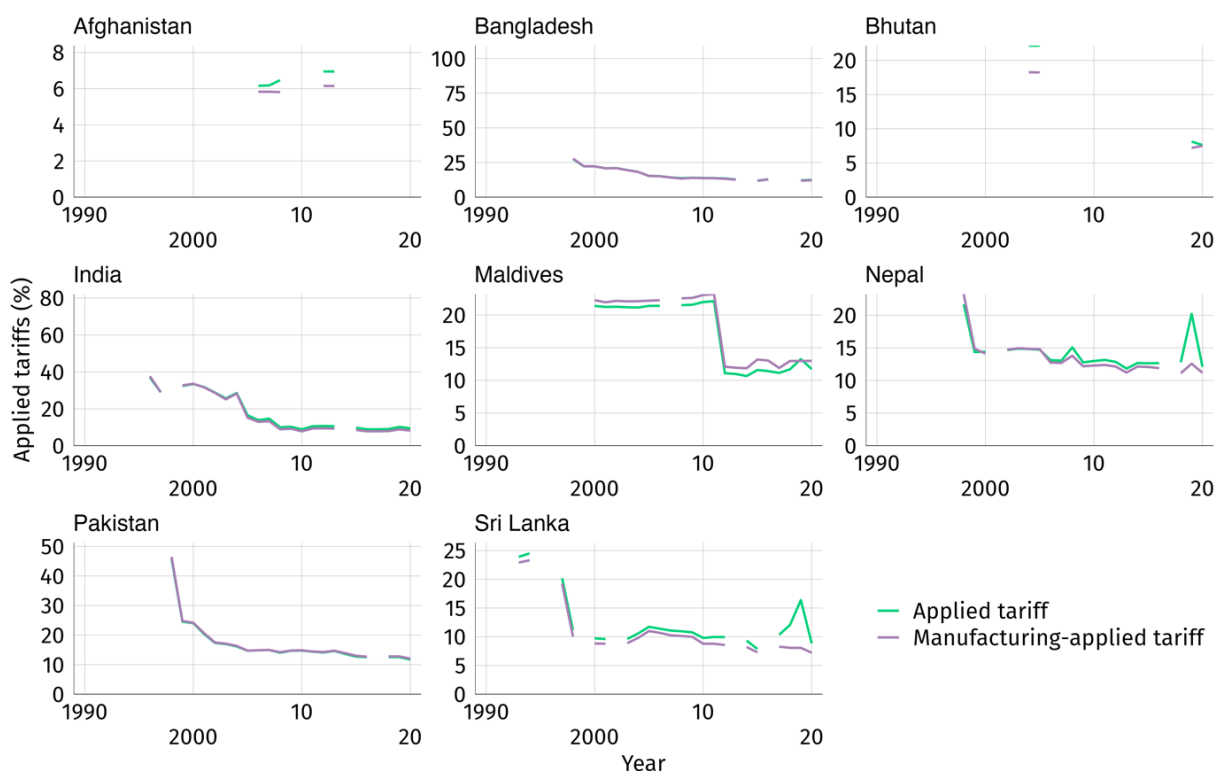
<sup>9</sup> A comprehensive review of distortions to agricultural incentives of Sri Lanka is available in Bandara & Jayasuriya (2007)

**Figure 38: Share of products with >15% tariff lines**



Source: Authors' illustration using WDI data

**Figure 39: Average applied tariffs and average applied tariffs on manufacturing**



Source: authors' illustration using WDI data

As shown in Table 7, agricultural tariff levels in South Asian countries are considerably higher than in East Asian countries. Yet, it should be noted that countries such as Thailand and South Korea also maintain high agricultural tariff levels. In addition, South Asian countries have agricultural products on the sensitive lists which are not liberalised in FTAs. The South Asian policymakers' preference to keep high tariffs on agricultural products has a political-economic rationale as a still largely rural population depends on agricultural for its livelihood. In recent trade policy changes, Sri Lanka also disproportionately restricted food imports (Wijesinghe, et al., 2023).

**Table 7 Agricultural tariffs of South Asian and East Asian countries**

Country	Agricultural tariff rate (%)		
	2019	2020	2021
<b>East Asia</b>			
Thailand	NA	NA	17.56
Indonesia	9.38	8.17	7.80
Philippines	6.06	6.00	6.43
Vietnam	10.83	10.48	8.55
Singapore	0.00	0.00	0.00
Malaysia	NA	2.78	2.79
Myanmar	7.45	NA	5.62
<b>South Korea</b>	NA	26.93	26.05
Taiwan, China	11.35	11.03	11.15

<b>South Asia</b>			
Bangladesh	16.93	17.16	17.50
Bhutan	17.83	10.27	7.50
India	33.94	31.59	32.04
Maldives	7.92	8.02	4.51
Nepal	13.93	14.84	15.88
Pakistan	13.60	12.80	12.93
Sri Lanka	23.30	22.64	10.85

Source: authors' compilation using WITS tariff data

In a nutshell, South Asia's agricultural trade policy can be characterised as distortionary and protectionist. Chronic use of ad hoc tariff revisions; strategic use of sensitive lists to avoid liberalisation and non-tariff barriers are the widespread characteristics of the region's agricultural trade policy. The impact of this distortionary incentive structure for domestic agriculture is reflected by the disproportionate labour force in the agriculture sector. It can be equally argued from the political economy literature that a large agricultural labour force motivates higher protection. The daunting policy challenge is to introduce reforms that may expose the domestic agriculture sector to competition so that the sector can develop based on comparative advantage. The political cost of such policy reforms can be high, but manageable with prudent policies. In contrast, producer-focused trade policies may harm net food consumption in urban and suburban areas (Wijesinghe & Kaushalya, 2022).

### **3.10 Agricultural labour**

The agriculture sector accounts for the largest share of workers in the highly populous South Asian region with a labour force of 655 million workers in 2021 (The World Bank, 2023). Currently, over 42% of the labour force in the region is employed in agriculture (ibid.) compared to over 62% being employed in agriculture in the early 1990s. Even with this decline of 32% of agriculture workers, the region stands out against the global average of 27% employment in agriculture. Thus, the South Asian region is still prominent as one of the most labour-intensive agriculture areas in the world (FAO, 2022) As a result, the South Asian region has one of the world's lowest levels of agricultural labour productivity. Within the region, according to USDA (USDA, 2022), Pakistan had the region's highest agriculture labour productivity in terms of output per worker from 1983 to 2019 only to be surpassed by Sri Lanka in 2020. The lowest agriculture output per worker was Nepal's during the period 1961-2020 while India and Bangladesh have the third lowest levels of agricultural labour productivity. In the year 2020, Sri Lanka recorded 3083 US\$ output per worker while the lowest recorded in the region for the same year was Nepal's at 1075 US\$ per worker.

Apart from the decline in the share of agricultural labour in South Asia the region's agricultural labour force has, over time, indicated certain noticeable characteristics such as increased participation of women and an increased reliance on a mature age population. These have occurred in response to a progressive fall in the rural

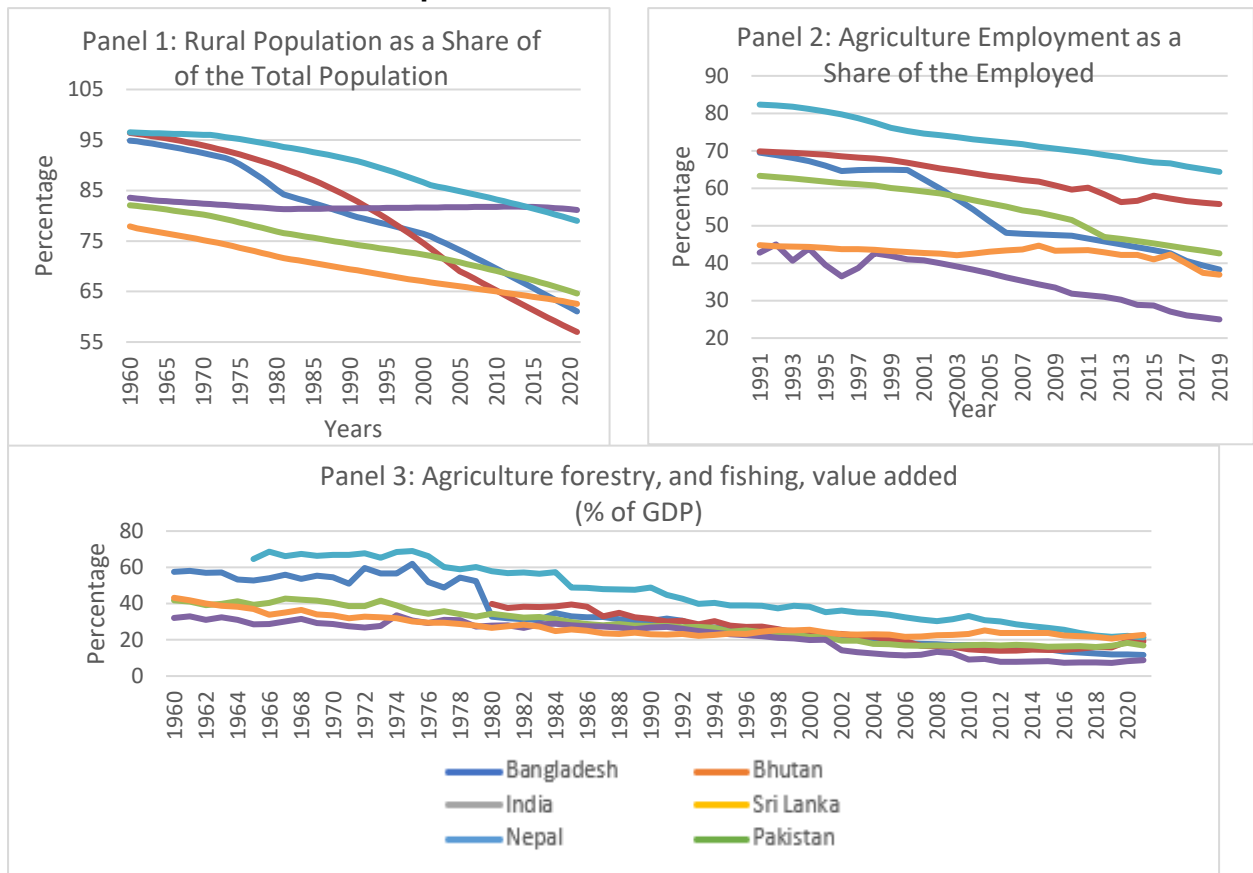
population and increased urbanization, coupled with out-migration (ADB, 2021). Rapid structural change causing the rural population to drop drastically has been a characteristic of the Asian development process since the 1970s (ADB 2020a in (ADB, 2021). This is a key force behind the very substantial fall in agriculture's share of GDP as well as its employment share in many of the developing countries in the Asian region.

### **Trends in agricultural labour**

South Asia's rural population as a percentage of the total population has fallen from 83 % in 1960 to 63 % in 2020 (The World Bank, 2023). A fall in the rural population only coincides with a fall in agriculture labour in Nepal, India, Bangladesh, Pakistan, and Nepal. The exception is Sri Lanka which shows an unusual pattern in its demographics given the share of the rural population has remained stagnant at around 84-80 % since the 1960's. Further, in 2021 Sri Lanka surpassed Nepal as the country with the highest percentage of the population residing in rural areas. Nevertheless, its employment share in agriculture has continued to fall over the past decades - similarly to the rest of the region – although at a much lower rate (see Figure 41). The likely reason behind the unrealistic high share of rural population in Sri Lanka is the weakness in the administrative definitions adopted to define urban and rural areas which fail to capture actual urban and rural populations (Weeraratne, 2016).

Agriculture's share of GDP in the South Asian region has fallen from 44 % of total GDP in 1960 to a mere 17 % by 2021 (Figure 40). Nepal has retained the highest share of agriculture production as a share of GDP from the 1960s to 2020. However, in 2021 Pakistan was the country with the largest share of agriculture in GDP in South Asia taking up 22 %. Over the years, the share of GDP has fallen for all the countries in the region, despite some short-term upturns in the trend. It is interesting to note how the share of agriculture's GDP coincides with the share of employment in the agriculture sector.

**Figure 40: Share of rural population, agriculture labour and agriculture production in South Asia**



Source: Authors' illustration based on World Bank data

## Women in Agriculture

Across the world, female participation in agriculture has always been substantial, although much of their contribution has been as unpaid work. Women's work in agriculture includes unpaid domestic work and home-based gardens maintained by women, which help sustain the human and social capital of households engaged in agriculture. Thus, they also form an integral part of maintaining food security, where it is estimated that women are responsible for half of the food crop production while they make up 43% of the agricultural labour worldwide. The women's role and involvement in agriculture differs from culture to culture even within the Asian context as they are dependent on crop systems, gender norms, division of labour and many other socioeconomic factors (Gunawardana, 2018). "In South Asia, men take the lead in seedbed and land preparation, crop management, machine operation, and marketing, while women are mainly responsible for post-harvest activities, as well as assisting men with seedbed and nursery preparation" (Ahmed et al. 2013 in (Akter, 2021, p. 2).

In recent years with male outmigration becoming increasingly prevalent within the South Asian region, agriculture has become even more reliant on women. It is more

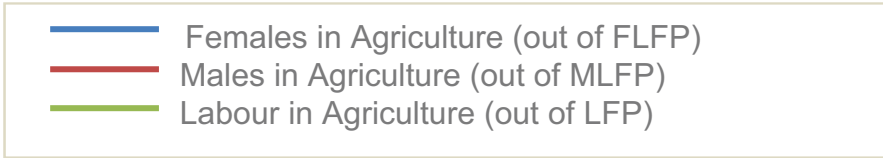
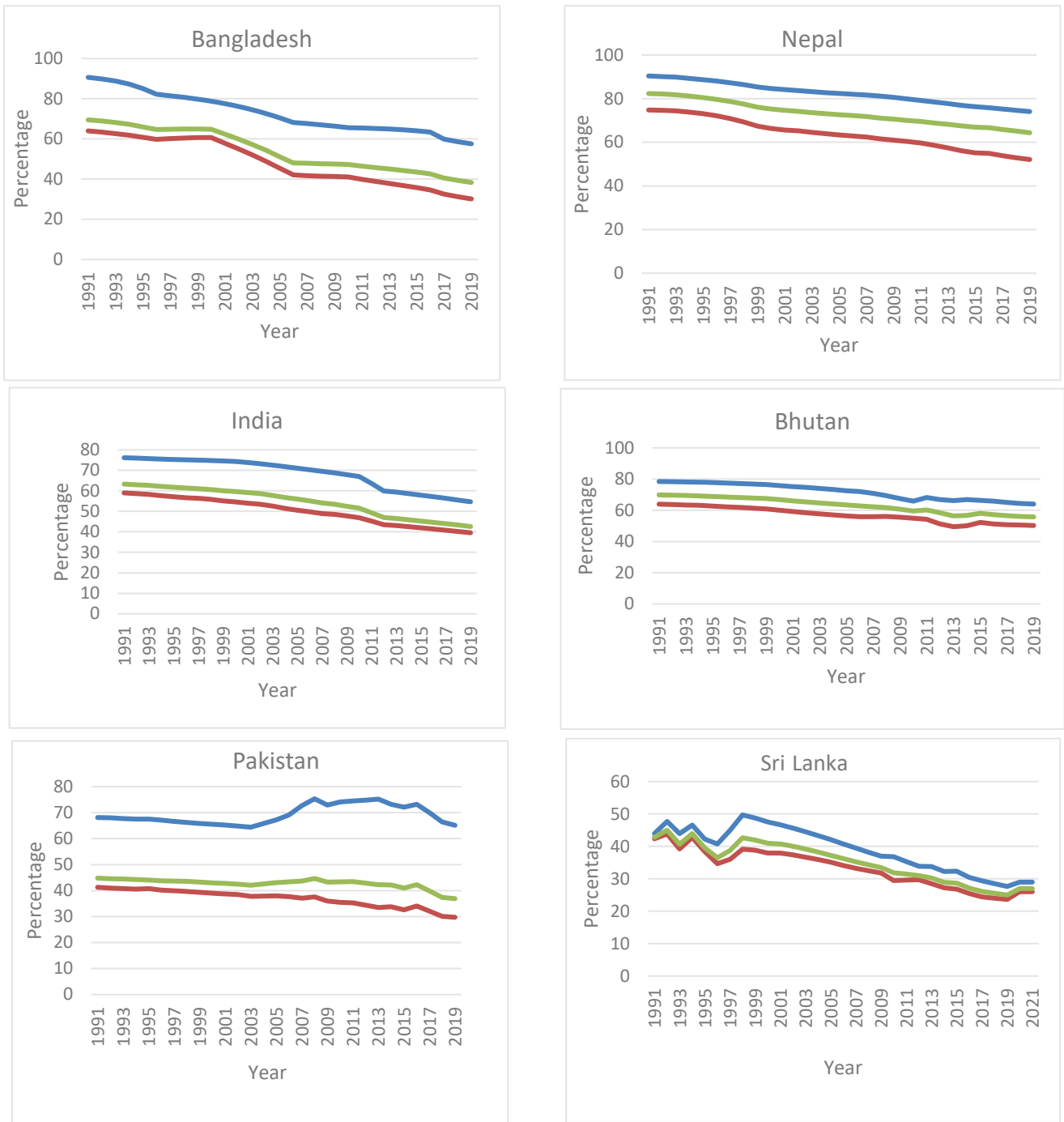
significantly evident within countries such as Bangladesh, and Nepal. In Bangladesh female workers in agriculture rose by 9.3% from 2010 to 2019, and by 7.7% in Nepal (ADB, 2021).

Analyses of female participation in the labour force by sector and by country within the agriculture sector indicate that Pakistan has shown an increasing trend during 2005-2018 where a majority of working women were employed in agriculture around 75%, which is even more than the figures recorded in the '90s (65-70%) (See Figure 41). Though a similar trend was observed in Sri Lanka from 1991 to 1997, it continued to fall thereafter with a jump in the proportion of women employed in agriculture from 45% in 1991 to 50% in 1997. However, female participation rates in South Asia have always been highest in Nepal and Bangladesh - around 80-90 % in the early 90s – but have been falling since 1991. (See Figure 41).

Sri Lanka remains an outlier throughout the region as its female participation in agriculture though higher than men's, has been the lowest. However, this is true when it comes to the country's overall agriculture employment. Thus, in terms of the gender gap, Sri Lanka once again has the lowest gender gap in participation rates which has been between 2 – 10 % since the 1900s. The gap consistently increased from 2% to a difference of 10% from 1991-2000. But from 2000 onwards the difference has begun a slow downward trend although has yet to hit its previous low of a 2 % difference recorded in 1991. Thus, regardless of the difference between males and females, Sri Lanka too has experienced an increasing female participation trend, especially in the first ten years from 1991. However, looking at the data the gap between the men's and women's participation rates has fallen (see Figure 42).



**Figure 41: Labour participation in agriculture as a percentage of total LFP**



Source: authors' compilation using U.S Department of Agriculture research service data

Another, interesting fact about Sri Lanka's female participation in agriculture is the change in labour force participation over a person's lifecycle. A study carried out over the period 2014-2016 based on a sample of 2093 rural women shows how in each age category, participation in any form of earning varies across the life cycle. It points to an inverse u-shaped curve pattern, with a peak in their 20's-40's and a sharp fall after the age of 50. However, the data for women engaged in agriculture showed distinct differences. Though still following an inverse-u pattern the lowest levels of participation were recorded for the 21-30 age group. Noting that about 92 % of the population was married between 16-30 years of age, and all of them had their first child by the age of 35, the authors note an interesting trend in increased participation in the agricultural sector which increases up until it reaches a peak at the age of 60. This speaks about how dependent women have become on agriculture as a livelihood specifically as they get married and have children (Gunawardana, 2018). Furthermore, women are more represented within family labour than they are among hired agriculture labour (Bamunuarachchi, 2018)

The literature indicates that the decline in female labour force participation in agriculture in Sri Lanka during recent years can be understood under several themes De Silva (2012) highlights gender discrimination in the labour market, the replacement of female workers due to capital-intensive production methods, the greater tendency among women to get further education and the burden of household and childcare work. Further confirming the role played by mechanization in female labour participation in agriculture, (Bamunuarachchi, 2018) in their study, indicates that 53% of the sample believed that the role of women in agriculture has changed with the introduction of mechanization.

In the absence of opportunities in rural communities, women have opted for job opportunities in the export processing sector as well as in the garment sector in urban areas and as domestic workers abroad (ADB, 2004). Hettige (2002) notes that this outflow of female labour is a product of a change in attitudes regarding agriculture, where agriculture in comparison to the new industries opening after 1977 with globalization and open economic policies, has become the least preferred occupation among women, especially the youth. Thus, discrimination, instability of income and obstacles faced by women as analyzed by Erfurt (2005), mean pursuing the above-mentioned alternatives produces particular benefits including earning a stable income, contributing to family expenditure and in some cases saving and building up asset ownership. Further underling these advantages the ADB (2004) highlights that female garment factory workers from rural agricultural settings, who used to earn irregular income, have now become economically stabilized and empowered.

## ***The gender gap in earnings***

Within the South Asian region, 70% of females who are employed are engaged in agriculture-related work. Yet, their participation in agriculture is still not culturally recognized as women are rarely referred to as 'farmers' but are mostly looked at as ones taking care of 'family work'. Amidst discrimination and barriers to land ownership, technology, services, training and financial assistance, they face gaps when it comes to wages as well. Furthermore, they are underrepresented in decision-making at local government institutions as well as at the parliamentary level which typically makes policy-making insensitive to the needs of women and their social inclusion (Gunawardana, 2018; ADB, 2021).

In terms of agriculture wages, there is widespread evidence that women have consistently earned less than their male counterparts. This is an observed pattern within South Asia (Mahajan, 2017; Zhang, et al., 2014; Yamauchi, 2021). A study covering 14 states in India (Mahajan, 2017) finds that female daily wage rates for agricultural workers from 1993 to 2007 were just 72% of what their male counterparts earned. In Bangladesh, (Zhang, et al., 2014) there has been a consistent gap between the two genders between 1995-2010 even though real wages for both genders have increased. In 2010 men earned 36% more than women, in the peak season.

The gender wage gap is determined by gender-based discrimination, where women get paid less for equal work (Yamauchi, 2021). Additionally, there is also gender-based segregation of tasks in agriculture. Evidence shows that women's work is usually undervalued and paid less than male tasks. Moreover, often there are limited opportunities for non-agricultural wage work thus leaving agriculture as the only employment option available for women (Garikipati, 2008). Furthermore, women are typically forced to look for opportunities within low-paying agriculture jobs as, unlike men, they have few opportunities to commute daily long distances and/ or migrate in search of better-paying jobs, or start self-employment due to the lack of access to resources or lack of control over assets (ibid). This can further explain the higher rates of feminization within agriculture especially in Nepal and Bangladesh which also have higher levels of male migration.

## **Access to resources**

In India almost 40% of smallholders are women yet they are severely affected by lack of access to credit (World Food Program, 2020) There have been instances where progressive changes have brought about positive results not only for the women engaged in agriculture but also their children. For example, in Nepal, greater land ownership gives more decision-making power to women within the household and helps reduce the probability of their children becoming underweight (Pokharel, 2008). Thus, empowering the women within agriculture would help reduce not only their access to employment but would also contribute to a fall in child malnutrition in rural

areas while helping increase food security in such households that depend on agriculture.

In the Sri Lankan context, despite laws disallowing discrimination over land ownership by gender, discrimination arises from customary laws (Kandyan law, Tesawalame law, and Muslim law). These limitations and lack of clear title for ownership lead to further obstacles in obtaining irrigation facilities, credit and fertilizer. As title deeds are needed for obtaining credit as well as for becoming a member of farmers' organizations, women are cut off from access to credit as well as subsidized fertilizer or training programs that enroll labour registered in farmers' organizations (FAO, 2018). A further legal restriction is that "women's traditional work in the Dry Zone chena cultivation has been curtailed by the nature of the agriculture promoted in government settlements". This further keeps women from inheriting title deeds that again continue the vicious cycle of discrimination against female labour (Lakshman, et al., 2011). The situation is similar in other South Asian countries too and the struggles of women are ongoing for land and other resource rights (Velayudhan, 2009). This echoes the need for gender mainstreaming in policymaking that opens up access to services and resources required by female agriculture labourers.

### ***Aging of the worker population***

The share of older agriculture workers increasing over time is an issue in countries with low population growth rates such as Sri Lanka. Thus, in the South Asian region, Sri Lanka stands out as a country with significant labour market and participation issues relating to an ageing population. The average age of workers in Sri Lanka was 49.7 in the year 2017. Moreover, the proportion of people over 65 years will increase from 7% to 21 % from 2007 to 2045 and the share of agricultural workers aged 50 or older has increased from around only a third to almost a half in the years following 2000. This is a rapid change in comparison to the other countries in the region. Consequently, the low level of fertility and the fast rate of aging will affect the country's productivity in the future (ADB, 2019). This raises concerns related to falling productivity as older workers tend to work fewer hours. For instance, an ADB study indicates that "more than half of agricultural workers in the selected Asian economies aged 60 or older work less than 40 hours per week" (ADB, 2021).

Also of concern are the findings of Weeraratne et al. (2020) who shows that older workers are less interested in adopting modern technology for vegetable cultivation and specific activities in agriculture. Rannan-Eliya (1999) points out that while an aging workforce may be less productive and less flexible in terms of relocating due to employment, most productive countries at present have some rapidly ageing populations. He concludes that investment in training in regard to skills and flexibility can outweigh the negative impacts of an ageing labour force. (Rannan-Eliya, 1999, p.

15). Weeraratne et al. (2020) finds some evidence of this in that the older age group of over 55 years was found to be associated with a higher mechanization score of 0.017 in the case of land preparation in vegetable cultivation.

### ***Youth moving away from agriculture***

The ageing agriculture workforce, as well as the falling employment rate within agriculture, has been noted in many studies regarding Sri Lanka (Weerahewa, et al., 2015; Bamunuarachchi, 2018; Damayanthi & Rambodagedara, 2013). (Bamunuarachchi, 2018)A plausible reason for this diversion of labour, especially where it involves the movement of youth away from agriculture, is given by the high share of young people with secondary education and their desire for better outcomes related to job security, regular income and social security that do not go hand in hand with employment in agriculture in Sri Lanka. At the same time, limited resources for agriculture (such as landlessness, lack of access to markets, and lack of financial and non-financial investment in agriculture) coupled with the low status attached to agriculture work act as factors that push youth away from agriculture-related work (Damayanthi & Rambodagedara, 2013; Ranathunga, 2011; Bamunuarachchi, 2018); (Ranathunga, 2011); (Bamunuarachchi, 2018)). Further, some studies underline psycho-social phenomena that keep young people away from agriculture due to aspirations related to the job market and a standard of living that does not tally with the existing life of an average farmer (NDC, 1996), (Damayanthi & Rambodagedara, 2013); and (DailyFT, 2017)). Further, Damayanthi, et al. (2013) show that 7% of the sample were involved in agro-based industries. As a solution to the increasing number of youth out-migrants and the ageing of the agriculture population, agri-food value chains (that are backed by increasing demand for value-added food and processed products) could be promoted (Weeraratne, et al., 2020). (Damayanthi & Rambodagedara, 2013) found that according to the views of young people in their sample, full-time agriculture employment was positively correlated with experience in agriculture, adequate family labour and basic assets. Furthermore, this sub-sample also shows several factors force some of the youth in the sample to remain in the agricultural environment. They include a lack of skills and knowledge that would ensure employment outside of agriculture and the existence of family issues such as having to take care of parents and/or disabled households.

### ***Outmigration from agricultural areas***

Out-migration is seen as a reason for ageing of the agriculture population in Sri Lanka and an increase in the numbers of women in the agriculture workforce in the South Asian region. In terms of ageing, (Samaratunga, et al., 2012), indicate that by the mid-1980s, in Sri Lanka, 65% of total internal migrants were unskilled workers with a majority coming from rural agriculture-based areas. The authors also note that out-migration has led to a fall in rural household labour, a rise in wages and an increase in hired labour costs. This study further highlights that investment of remittances sent home by these migrants, though invested in agriculture, did not lead to a significant

difference in investments in agriculture in comparison to households without migrants. As the findings pointed to a perception of the drudgery associated with agriculture being a reason for youth to depart from agriculture, ways to enhance adaptation of new technology and formalization of agricultural employment may help retain youth within agriculture.

Male out-migration in countries such as Nepal, India and Bangladesh that leaves agriculture unattended, is seen as a driving force behind the increasing feminization of agriculture (Rana, et al., 2018). These studies further note that apart from women being forced to take up the left-behind agriculture work, the lack of laws ensuring asset ownership, gender caste discrimination in resource distribution and access to resources, highlight the difficulties faced by women in South Asia even when a feminization of the sector is evident.

### **3.11 Mechanization & technology adoption in South Asia**

Mechanization is a critical component of agricultural production that has been neglected historically in developing countries. Augmenting manual and animal power in agriculture can lead to the timely and efficient completion of tasks and productivity improvements while conserving natural resources. Sustainable agricultural mechanization and technology can also contribute significantly to the development of value chains and food systems more broadly by making harvest, postharvest, processing and marketing activities more efficient and environmentally friendly. The start of the adoption of machinery and technology in agriculture in South Asia can be traced to the Green Revolution era. In the 1960s the Green Revolution was a significant policy shift in many developing countries that introduced high-yielding seed varieties, hybrid seeds and expanded irrigation infrastructure, while also promoting the use of various farm management strategies such as the use of chemical fertilizers and pesticides. While the green revolution led to substantial growth and progress in the agricultural sector, recent years have witnessed a decline in agricultural productivity levels, resulting in concerns over food security and low incomes for farmers.

The Green Revolution has been a key factor in Asia's agricultural success, particularly with new and improved crop varieties developed with modern plant breeding techniques. Crossbreeding was first used extensively in Japan and its colonies before the Second World War and breeding programs began in most Asian countries in the 1950s. International breeding programs were established for crops such as rice, maize, wheat, soybean, mung bean and vegetables. At the same time, modern varieties (MVs) were developed through national and international breeding programs and were released and diffused in Asia including South Asia from 1965 (Kaosa-ard & Rerkasem, 1999).

In addition to the green revolution, the traditionally labor-intensive agriculture sector in the South Asian region has also experienced a rapid shift towards mechanization due to various factors such as rising labor costs, increasing land fragmentation and

declining availability of farm labor. Over time, farm mechanization in South Asia has undergone a sequential evolution process. Initially, the region focused on high power-intensive farm operations, such as using mechanical threshers, tractors for ploughing land and electric pumps for irrigation, which required low-skilled labor. Later, medium power-intensive farm operations were adopted, such as seed-sowing machines and harvesters, which require medium-skilled labor. The evolution continued with the adoption of low power-intensive farm operations that require highly skilled labor, such as for paddy manual transplantation, grinding and harvesting of multiple crops. When compared to other South Asian countries such as Afghanistan, Nepal, Bangladesh, Pakistan, Sri Lanka and Bhutan, India has the highest level of farm mechanization. This is determined based on the types of machinery used for various farm operations and the level of farm machinery production within the country (Prakash-Aryal, et al., 2021). India has emerged as the largest tractor market globally, accounting for over 90 percent of the 660,000 tractors produced annually. The annual value of tractor sales in India exceeds US\$5 billion. (Bhattarai, et al., 2020)

Over the past five decades, Asia has made significant progress in the field of agricultural machinery. In the 1960s, mechanization in agriculture was limited, and most farm operations were carried out manually. However, in the past three decades, there has been a positive correlation between the availability of farm power and productivity in South Asian countries including Pakistan, India and Bangladesh. These three countries initially focused on selective farm mechanization, primarily using heavy tractors. India and Bangladesh also adopted power tillers and small-scale tractors to cater to the fragmented small farms. In contrast, Pakistan has shown a preference for larger tractors. Nepal, Sri Lanka, Bhutan and Cambodia have lower mechanization indexes compared to their neighboring South Asian countries (Usman Khan & Rehman, 2019). Currently, automatic combined harvesters are employed for cereal grain harvesting in some Southeast Asia countries. Often farmers in the region use medium-grade technology for harvesting paddy and wheat to minimize production costs. Pumps, tractors, power tillers and threshers are usually owned by highly mechanized farms, whereas low-mechanized farms tend to hire out their farm activity.

The crop output in the South-Asian region has been increased with the development of high-yielding varieties, fertilizer subsidies, good irrigation management and the adoption of farm mechanization such as the use of two and four-wheel tractors. Nonetheless, despite the remarkable development in agricultural machinery, manual farm operations persist, leading to poorer crop production compared to mechanized farms (Usman Khan & Rehman, 2019).

Apart from mechanization, South Asian countries have been leveraging modern technology in agriculture to improve their crop yields and productivity. For example, the demand for precision farming has increased due to limitations in crop production caused by resource depletion and environmental degradation (Zaman, 2023). Farmers are shifting towards sustainable agricultural practices and focusing on improved plant nutrition, crop protection and land management. Some of these

practices are adopting technologies such as IoT, GPS, and remote sensing for various farming activities, including irrigation and tillage. For instance, farmers are leveraging IoT to address crop monitoring challenges by using agricultural sensors to gather real-time data on environmental factors and soil conditions. This enables them to make informed decisions about harvest timing, crop pricing and soil management. Governments in emerging countries such as India and Sri Lanka are implementing initiatives to promote the adoption of advanced precision farming methods, hoping to drive production growth (Research and Markets, 2022). Similarly, drones are being increasingly utilized in the agricultural industry for a variety of purposes, such as precision spraying to replace aerial spraying of pesticides traditionally carried out using conventional aircraft or helicopters with pilots on board. These innovations are particularly notable in Southeast Asia, where drones are increasingly being employed for pesticide application (Erdal Ozkan, 2023). While South Asian countries still face constraints to adopting smart farming, over time such technologies will spread into this region.

While there are similarities between these countries' approaches to agricultural technology, there are also notable differences. One common feature is the use of mobile phones and mobile-based apps to provide farmers with real-time information on weather, crop prices and pest management. This technology is prevalent in all South Asian countries, and it has been instrumental in helping farmers make informed decisions. The adoption and implementation of various innovations are beginning to create significant impacts on the agribusiness sector. Innovations such as IoT (Internet of Things), robotics, AI (artificial intelligence), drones, precision agriculture, big data and analytics, controlled environment agriculture, agri-biotech, regenerative agriculture and connectivity technology have brought about substantial improvements and advancements across different aspects of the agri-business, driving increased efficiency, productivity, and sustainability (StartUs Insights, 2023).

### **3.12 Climate change and agriculture**

South Asia is one of the most vulnerable regions to climate shocks including intense heat waves, cyclones, droughts, and floods. The Global Climate Risk Index 2020 ranked India and Sri Lanka as the 5<sup>th</sup> and 6<sup>th</sup> most climate-risky countries in the world (German Watch, 2020). More than half of all South Asians, or 750 million people, have been affected by one or more climate-related disasters in the last two decades. The changing climate could sharply diminish living conditions for up to 800 million people in a region that already has some of the world's poorest, most food-insecure and vulnerable populations (The World Bank, 2022). As a natural resource-dependent sector, agriculture is most vulnerable to climate impacts. A temperature increase of 5.44°C and 2.93°C has been projected over South Asia in 2070-2099 respectively for the two IPCC emission trajectories A1F1 (highest future emissions) and B1 (lowest future emissions) from the level in 1961-1990 (Cruz, et al., 2007).



### ***Climate change and its impact on agriculture: the case of Sri Lanka***

Seasonality of rainfall is the main factor that determines the cultivation seasons of food crops. Major plantation crops are perennial crops cultivated in wet zone areas and therefore seasonality of rainfall is not a major issue. In contrast, the food crops subsector is mainly comprised of seasonal crops that require organizing all farming practices according to the seasonal rainfall availability. Hence, Sri Lanka's cropping calendar has two prominent seasons, '*Maha*' and '*Yala*', identified according to the seasonal distribution of rainfall. *Maha* is the main cultivation season supported by the northeast monsoon, the major source of water for the dry zone. During *Yala*—usually the dry season—people mainly cultivate highland crops under limited rain-fed conditions. A major feature of rainfall in Sri Lanka is high year-to-year variability. As a result, rain-fed farmers in the dry zone have been in a continuous struggle to adapt to climate shocks they now experience frequently. Recent studies indicate that climate patterns in Sri Lanka are changing. The main climatic parameters of interest are ambient temperature, precipitation patterns and extreme events.

Evidence suggests that atmospheric temperature is gradually rising almost everywhere in the country (De Silva, et al., 2007; De Costa, 2008; Eriyagama, et al., 2010; Mattssona, et al., 2015). Basnayake et al. (2002) noted faster warming trends in recent times compared to the past periods. The records of geographical temperature variations (Basnayake, et al., 2007; Sathischandra, et al., 2014) as well as temporal variations in ambient temperatures have been noticed (Basnayake, et al., 2007). As far as the changes in precipitation are concerned, no clear pattern has been observed. However, some studies have revealed that the average rainfall is declining (Basnayake, et al., 2007; De Silva, et al., 2007; De Costa, 2008). Nevertheless, the unpredictability of rainfall has increased over time. Therefore, researchers suggest that more than the changes in the total amount of rainfall, changes in distribution and variability are the key factors that determine the impacts on agriculture (Premalal, 2009; Ratnayake & Herath, 2005). Overall, unlike the case of rising temperature, no clear pattern or trend in changes in precipitation has been identified and researchers have expressed contradicting views.

Gradual changes in climatic conditions have already affected the production of domestic crops, including Sri Lanka's staple food, rice. Extreme climate events threaten to worsen this trend. Recent evidence suggests that the intensity and frequency of floods and droughts have increased in recent times (Ratnayake & Herath, 2005; Imbulana, et al., 2006). At the beginning of 2016, Sri Lanka faced the worst drought in 40 years, severely affecting the country's agricultural production (FAO/WFP, 2017). This situation was further exacerbated by severe floods in mid-2017 in the southwestern parts of Sri Lanka. Overall, the impact of continuing dry spells and severe floods severely affected the country's food production. The *Yala* of 2016 (May-September) – the first cultivation season following the drought – recorded

a 20% drop compared to 2015 in both production as well as the extent of cultivation. The main harvest season of Maha 2017 (December 2016-February 2017) achieved only half of the rice production of Maha in 2016 (Table 8). The Yala 2017 output too showed a further similar drop in production in other seasonal food crops.

**Table 8: Production of domestic food crops (Maha 2015–Yala 2017)**

Food item	Production (mt)					
	2015		2016		2017	
	Maha	Yala	Maha	Yala	Maha	Yala
Paddy	2,877	1,942	2,903	1,517	1,474	909
Kurakkan (Millet)	7,410	1,510	7,060	1,500	4,468	1,106
Maize	230,870	30,240	207,070	36,890	163,733	32,011
Green gram	7,620	7,440	7,980	6,570	4,896	4,496
Cowpea	7,240	5,040	8,810	4,930	4,937	3,639
Black gram	10,610	1,290	9,000	2,200	5,207	2,082
Gingelly	3,190	10,090	2,490	9,930	2,054	5,700
Potatoes	54,310	43,080	48,540	47,260	28,381	44,977
Red onions	35,210	25,990	35,480	28,190	33,407	24,340
Big onions	4,590	84,740	7,550	57,670	3,226	50,377
Chilies green)	42,830	20,040	50,720	21,590	30,690	21,137

Source: authors' illustration based on Department of Census and Statistics Data

There are few projections on climate change in Sri Lanka. Model projections also confirm that Sri Lanka will become increasingly warmer. Projections were made under different IPCC scenarios and projections for 2070-2099 suggest that the temperature could increase by 5.44 C and 2.93 C under emission trajectories A1F1 and B1<sup>10</sup>, respectively (Cruz, et al., 2007). Projections by (Suphachalasai, 2014) predicted that temperature could rise by 3.6 C, 3.3 C, and 2.3 C under A2, A1B, and B1 scenarios respectively by 2080 (Table 9). Widespread warming has also been projected for Sri Lanka by some regional climate model (RCM) experiments that are expected towards the end of the 21<sup>st</sup> century. IPCC studies further suggest that higher warming could occur during the north-east monsoon (NEM) than during the south-west monsoon (SWM) (Eriyagama & Smakhtin, 2010).

<sup>10</sup> A1F1 and B1 are two of the emission scenarios developed by IPCC. The A1F1 scenario represents a fossil fuel intensive emission trajectory. The B1 scenario envisages reductions in material intensity, introduction of clean and resource efficient technologies.

**Table 9: Temperature and precipitation projections under different scenarios**

Climate parameter	2030			2050			2080		
	A2	A1B	B1	A2	A1B	B1	A2	A1B	B1
Precipitation (%)	7.4	11.0	3.6	15.8	25.0	16.5	39.6	35.5	31.3
Temperature (C)	1.0	1.1	1.0	1.8	1.5	1.3	3.6	3.3	2.3

Source: Suphachalasai (2014).

Like in the case of observed changes, projections also are less certain about the changes in rainfall patterns. Most of the models project a higher mean annual rainfall (MAR) while a couple of others project the opposite (Eriyagama, et al., 2010). According to one projection, MAR will increase by 14% for A2 and 5% for B2 by the 2050s compared with 1960-1991 (De Silva, 2006). Ahmed and Suphachalasai (2014) predict increases in precipitation levels by 39.6, 35.5, and 31.3 percent respectively under A2, A1B, and B1 scenarios by 2080 (Table 8). Some studies have projected increased rainfall in the wet zone, intermediate zones, and north and south-western dry zones and decreased rainfall in other areas of the dry zone by 2050 (Basnayake & Vithanage, 2004). IPCC studies also project an increased incidence of extreme weather events in the South Asian region that may include heat waves and intense precipitation events (Cruz, et al., 2007). According to some projections extreme weather events may increase by 400% during 2071-2100 compared to 1971-2000 (Ahmed, et al., 2009).

There would be several physical hazards and vulnerabilities in agriculture, livestock, and fisheries sectors in Sri Lanka caused by seven major groups of physical effects due to climate change. Ahmed and Supachalasai (2014) have projected that climate change will affect rice yields negatively (Table 10). Their projections cover seven major agro-climatic zones of the country. They all indicate a drop in rice yields implying high losses in the agriculture sector due to climate change. Further, the projections suggest these changes are cumulative and progressive, and in some areas, losses could be as high as one-third of current yield levels by 2080. The threat of future uncertainties due to global climate change introduces new challenges to agriculture making it even more difficult for achieving the goals of food security. Losses and damages encountered by farmers due to unanticipated changes in the climate during the recent past indicate that the adaptive capacity of farmers has to be enhanced to face this challenge. This takes place at a time when socio-economic conditions faced by farmers also are undergoing a rapid transformation. As a result, farmers have to make their choices under dual sources of uncertainty relating to climate as well as socio-economic change.

**Table 10: Impact of climate change on rice yield in Sri Lanka**

Agro-climatic zone	Current rice yield (kg/ha)		% change in 2030		% change in 2050		% change in 2080	
	Maha	Yala	Maha	Yala	Maha	Yala	Maha	Yala
<b>Dry-Low</b>	3,498	3,863	-4.2	-6.5	-16.1	-19.8	-29.1	-34.2
<b>Intermediate-Low</b>	4,885	4,612	-2.7	-3.5	-10.6	-15.1	-24.8	-31.5
<b>Intermediate-Mid</b>	4,992	4,761	-1.9	-3.1	-9.3	-12.7	-22.5	-30.3
<b>Intermediate-Upland</b>	3,492	2,955	-1.3	-2.7	-7.5	-11.4	-20.3	-27.5
<b>Wet-Low</b>	3,910	3,711	-0.9	-1.5	-6.0	-10.4	-19.4	-25.1
<b>Wet-Mid</b>	3,538	2,795	-0.8	-1.4	-3.6	-8.2	-18.3	-23.6
<b>Wet-Upland</b>	3,134	2,706	5.7	3.1	2.1	-2.0	-8.6	-12.4

#### 4. Review of policies on agriculture in South Asia

##### 4.1 Evolution of agricultural policies in the region

Agriculture policies in South Asia have been shaped by various factors, including the region's agricultural practices, socio-economic conditions, technological advancements and policy priorities. Therefore, it's important to note that the specific policies and their implementation vary across countries in South Asia, reflecting the diverse contexts of each nation. Overall, over the past several decades, agricultural policies in South Asia have sought to achieve food security, often interpreted mistakenly as food self-sufficiency while seeking to ensure that farmers receive remunerative prices, and that the food is available for consumers at affordable prices. Within this background, South Asian countries have applied a diverse range of policy instruments that include price control measures, fertilizer subsidy programme, seed production programmes, incentives for mechanization, provision of irrigation water, research and extension, insurance and concessionary credit.

The history of agricultural policies in South Asia can be divided into four phases; (i) the capital transfer and infrastructure development-based plantation agriculture phase before the 1930s (ii) the land development and irrigation-based phase from the mid-1930s to 1950s (ii) The new technology base "Green Revolution Phase" from mid-1960 till mid-1980s and (iii) The liberal and export-oriented phase starting in the late 1980s and continues to date (Bresciani, et al., 2019). However, it is to be noted that the impact of these broad paradigms on agricultural sub-sectors in South Asia was uneven.

In the land development and irrigation-based early phase of agricultural development, the needed policy support was irrigation infrastructure and an institutional framework that could support the functioning of the infrastructure. Many countries in South Asia

implemented land reforms during this period to address the issue of land inequality and rural poverty aiming at redistributing land ownership, providing security of tenure to farmers and promoting agricultural productivity. Examples include Sri Lanka's Land Reform Act of 1972 (LRA) which sought to establish a ceiling on private land ownership by stipulating limits on paddy lands (25 acres) and other agricultural lands (50 acres). Further, large plantation estates run by foreign companies were nationalized under an amendment to the Act in 1975 acquiring over 400,000 ha of estate land. A Land Reform Commission (LRC) was established to acquire and dispose of property eligible for acquisition under the LRA (IPS, 2017).

The second phase of agricultural development (Mid-1960s-mid 1980s) was centered on the green revolution which aimed at increasing agricultural productivity through the adoption of high-yielding crop varieties and increased use of fertilizers and pesticides while expanding the irrigation facilities and the institutional structures which were already in existence (ADB, 2021). Technology generation and dissemination, or research and extension, have been the central focus here. However, this input was not uniformly provided to all sub-sectors. The policies focused mainly on ensuring food security and self-sufficiency by boosting cereal production. Therefore, even under the heavy investment made under this policy, it brought the expected results in terms of increasing the overall production of rice and other field crops but with little diversification.

During the third phase (1980s-1990s), countries in South Asia initiated market-oriented reforms such as liberalization of agricultural markets, reduction of government intervention, and encouragement of private sector participation in response to economic crises and a growing recognition of the limitations of state-controlled agriculture. These reforms aimed to increase efficiency, attract investment and promote exports. For example, change in the overall economic policy of Sri Lanka from an inward-looking one to an outward-looking one in late 1970 (IPS, 2015).

From the year 2000 onwards, South Asian countries have increasingly recognized the importance of diversifying agricultural production and adding value to agricultural products with policies focused on promoting horticulture, livestock, fisheries and non-traditional crops while improving post-harvest infrastructure, establishing agro-processing units and enhancing market linkages. With the growing concerns over climate change and environmental degradation in recent times, South Asian countries have shifted their focus towards sustainable agricultural practices including policies aimed at promoting organic farming, conservation agriculture, precision farming and renewable energy use in agriculture. Governments have also sought to enhance farmers' resilience to climate-related risks through improved irrigation systems, crop insurance and disaster management programs. Also, there has been an increased emphasis on rural development and farmer welfare in South Asia strengthening measures such as the provision of subsidies, credit facilities, insurance schemes, pension schemes, and social safety nets for farmers (FAO, 2014).

Agricultural policies in South Asia have been designed and implemented by a complex system of institutions. Sub-national governments (states, provinces, etc.) have some responsibility for certain aspects of agriculture, but the national government plays an important role by developing policies and strategies and providing the necessary funds for implementation at the sub-national level. Also, in certain cases, there are several policy documents related to different aspects covered by the agricultural policy such as land, seed, etc. Nevertheless, no sufficiently strong mechanisms exist to bring national and sub-national level policymakers and institutions together to discuss problems, design solutions and monitor performance (OECD, 2018). Therefore, there is a substantial policy and institutional gap in agricultural policy development and implementation. In addition, frequent changes in governments and ad-hoc policy changes are generating formidable challenges for the success of policy implementation.

#### **Box 4: Agricultural policies & regulatory framework in Sri Lanka**

In Sri Lanka, the country's strategic development framework under the Gotabhaya Rajapaksha government in 2019 was enacted under its long-term development plan, National Policy Framework: Vistas for Prosperity and Splendour (NPF); its medium-term development plan Public Investment Programmes: 2017-2020 and 2021-2024 (PIP), and its short-term plan - the budget documents from 2019 to 2021. Policies, strategies and activities related to agriculture are covered under the key policy document "People Centric Economic Development" of the NPF. The NPF emphasizes the importance of introducing a national agricultural policy that aims to increase agricultural income, make farming an attractive profession and support small producers with modern technology to become more competitive. After widespread public resistance to the Gotabhaya government, Ranil Wickremesinghe was sworn in as the President of Sri Lanka on 21st July 2022. Reforms have been designed along the four pillars namely economic and financial reforms; investment drive; social protection and governance; and state-owned enterprises transformation with the overall national vision to become a fully developed country by 2048. Agricultural transformation through reforms in different sub-sectors is a key component of the current policy strategies. Sri Lanka's long-term strategic outlook should ideally be integrated into the medium-term development plan (PIP) and the short-term plans (Budget documents) which has not generally been the case.

At the sectoral level, different policy areas under the theme of agriculture are covered by multiple sub-sector policies which include the National Agricultural Policy (2023), National Land Use Policy (2007), National Plantation Industry Policy Framework (2006), National Livestock Policy (2006), National Policy and Strategy on Cleaner Production for the Agriculture Sector (2012), National Agricultural Research Policy and Strategy 2018-2027 (2018), National Policy on Sustainable Consumption and Development (2018) and National Fisheries and Aquaculture Policy (2018-2025). There is an ongoing process to develop a comprehensive overarching agricultural policy towards achieving three main building blocks: food security, environmental sustainability and economic opportunities focusing on all sub-sectors in agriculture. However, it is yet to be approved in the parliament as a national policy. Historically many of such policies are limited to stated policy objectives and mission statements without clear programs and resource commitments to achieve specific goals through targeted policy instruments. There is a clear role for development partners to contribute to such capacity developments and demonstrate policy best practice which can be used as guides across other sectors. Such an exercise can demonstrate the value of policy coordination across sectors, policy compliance, monitoring and evaluation and appropriate sequencing for measurable impact.

Policies are not just what is written in a formal policy document approved by the Government, but also include the application of many policy instruments that often do not appear in such documents. Policy instruments are the techniques used by the governing authorities to implement policies to achieve set goals. Sri Lanka has several pieces of legislation that support the implementation of the policies. These include the Control of Pesticides Act, No. 33 of 1980; Control of Pesticides (Amendment) Act No. 6 of 1994; Regulation of Fertilizer Act, No. 68 of 1988; Seed Act No 22 of 2003; Soil Conservation Act of 1951 and Soil Conservation (Amendment) Act, No. 24 of 1996; Land Development Ordinance No. 19 of 1935; State Land Ordinance No. 8 of 1947; Agrarian Development Act (No. 46 of 2000); Food Act 1980; Animals Acts Nos. 29 of 1958/20 of 1964; Animal Feed Act No 15 of 1986 and the Amendment in 2016, Animal Diseases Act, No. 59 of 1992; Fisheries and Aquatic Resources Act (FARA) of 1996, National Aquaculture Development Authority of Sri Lanka Act Number 53 of 1998, National Aquaculture Development Authority of Sri Lanka (Amendment) Act Number 23 of 2006 and Fisheries and Aquatic Resources Act No. 54 of 1998 (FARA). Most of these regulations haven't been updated to reflect the changes happening in the agriculture sector.

## 4.2 Policy challenges in South Asian agriculture

### *Agricultural land use policies*

Land Management is critical to enhancing the sustainability of the economy of South Asian countries, especially agriculture production since the unrestricted expansion of cultivation areas is no longer possible due to growing land scarcity. For example, in Sri Lanka per capita, arable land area is declining drastically and in rural and sub-urban areas around major cities and town centres, agricultural lands under crops such as rubber and coconut are fast being converted for residential, commercial, or industrial purposes. Increased competition for land between agricultural and non-agricultural uses has also become an emerging issue. Large-scale acquisitions of land for infrastructure projects, industrial agriculture, and other commercial purposes often result in the displacement of local communities and loss of livelihoods undermining food security and rural income generation. Growing demand for land from industry, infrastructure, residential and other sectors need to be balanced with demand from agriculture. These further imply that the scarcity of land is growing rapidly, and the country cannot allocate land for other economic uses without decreasing the forest cover which has already fallen below 30%. That is unless a rational policy is devised to improve the efficiency of existing land uses (IPS, 2017).

In many parts of South Asia, particularly in rural areas, land tenure insecurity is prevalent. Weak land registration systems, informal land rights and lack of clear ownership documentation make landholders vulnerable to disputes, land encroachment and forced evictions. This insecurity discourages long-term investments in land improvement, affects agricultural productivity and undermines livelihoods. For example, in Sri Lanka, the tenure of a large share of land has changed from a traditional common property rights system to crown property and then back into private use under different land tenure and ownership arrangements within less than two centuries. In addition, encroachment of state land left a large extent of land under 'de-facto' private tenure status without valid ownership claims. This has led to the creation of a complicated situation in land tenure and ownership arrangements due to the lack of clear titles for many parcels of land. The situation reduces the economic mobility of land in response to changing demands from the economy and prevents the efficient allocation of land for the highest-valued uses (IPS, 2017).

Growing scarcity of land due to population growth and lack of clear titles has led to a fragmentation of land (i.e., division of agricultural land into smaller and economically unviable plots over generations due to inheritance practices). Tenure of land is also threatened with adverse incentives that lead to land fragmentation and encroachments, negatively affecting initiatives for sustainable management of land. In South Asia, small and fragmented landholdings are common, which hampers efficient agricultural production, limits economies of scale and reduces farmers' access to credit and modern farming technologies. This has negative implications on the productivity of agricultural lands as well as the suitability of land for other economic



uses. Increased fragmentation of land and the lack of clear titles encourage encroachment of state lands. When encroachments occur in critical places such as reservations for catchments of reservoirs and waterways, damage to the ecosystem can occur. In Sri Lanka, encroachments have been stimulated further by the state policy of regularization of encroachments. Encroachers first occupy the land without permission and the government offers deeds later. This practice is responsible for the encroachment of forest areas, leading to deforestation. (UNDP, 2015).

Land policy is closely connected to deforestation, a critical environmental problem faced by Sri Lanka. For example, deforestation has taken place on a large scale in land alienation schemes such as irrigated colonization due to the inundation of extensive areas of forest for irrigation structures, conversion of natural forests into agricultural lands, opening up forest cover for settlements and infrastructure facilities and encroachments of surrounding forest areas by subsequent generations due to rising scarcity of land (UNDP, 2015). Two waves of deforestation have occurred in Sri Lanka. First, under the Crown Land Encroachment Ordinance, a significant share of land was made available for plantation crops which were earlier located in the wet zone forest ecosystems rich in biodiversity such as the region of Sinharaja. Second, under the Land Development Ordinance, the existing forest cover in dry zone areas was identified as 'underdeveloped crown land' opening up the way for the second major wave of deforestation in dry zone lowland areas. (IPS, 2017).

Growing land scarcity, increased fragmentation of land, and encroachment of state lands catalyzed the process of land degradation that had already commenced. Also, the efforts to intensify the productivity of lands through conventional methods have resulted in unsustainable outcomes such as land degradation, soil erosion, water depletion and pollution and destruction of biodiversity. Further, climate change impacts, including increased frequency of extreme weather events, changing rainfall patterns and environmental degradation, pose additional challenges to land policy in South Asia. Rising sea levels, land erosion and salinization can negatively impact coastal communities and agricultural land. Integrating climate-resilient land use planning and sustainable land management practices is essential. Weak land governance, ineffective land administration and inefficient land management institutions also contribute to land policy challenges in the region. Issues such as corruption, bureaucratic delays, lack of transparency and weak enforcement of land-related regulations impede equitable access to land, fair land transactions and efficient land use planning are some of the issues related to land governance.

Current land policy in Sri Lanka remains biased towards an inward-looking development model based on small-scale peasant farmers. Land allocation among crops shows that the existing cropping pattern is strongly biased in favour of rice. (Weerahewa, 2017). This has been a constraint to the diversification to high-value crop sectors in Sri Lanka. The major objective of land policy traditionally is to hold untitled land under government ownership and distribute such lands as small holdings for agricultural production purposes, while preventing further subdivision of land

holdings. There are also restrictions on the use of paddy lands for any other purpose under the Paddy Lands Act of 1956 which was partially and conditionally relaxed under the Agrarian Services Act of 2000 (Samaratunga & Marawila, 2005). The mismatches and limitations of unaltered land policy in relation to the needs of current national development priorities are therefore becoming increasingly apparent. This has recently drawn the attention of policymakers and created a recognition of the necessity to revisit land policy and make adjustments to meet present needs (IPS, 2017).

Addressing these land policy challenges requires comprehensive and context-specific approaches that include implementing land reforms to promote equitable land distribution, strengthening land tenure security, and improving land administration and registration systems. For example, in Sri Lanka, institutional reforms to consolidate private property rights on land and develop a land market have been a key policy concern in recent times. In recognition of this need a 'Land Titling' project has been implemented. Rationalizing land ownership for efficient use of the land resources is expected to increase access to land by efficient farmers and to encourage the adoption of high-value agriculture, particularly exportable fruits, and vegetables, instead of low-value agriculture while addressing the twin challenges of low productivity and efficiency. However, serious attention is needed to address possible equity implications for marginalized and vulnerable groups. Also, policy reforms should include strict enforcement measures of regulations relating to land use such as limiting agricultural land uses only to suitable land classes, amending regulations on soil conservation to prevent improper land uses, identifying activities leading to the degradation of land and initiating conservation practices in susceptible areas and preventing land encroachment, especially in environmentally sensitive areas.

### ***Irrigation policies***

Water is a finite resource with multiple uses for drinking and sanitation, agriculture and industry. Irrigation policy issues in South Asia vary across the different countries in the region, but there are some common challenges that many countries face such as water scarcity, inadequate infrastructure, unequal access, inefficient water use, groundwater depletion and governance and institutional challenges.<sup>11</sup> South Asia is home to several arid and semi-arid regions, where water scarcity is a significant challenge. The demand for water for irrigation often exceeds the available supply, leading to conflicts between different user groups and inefficient water allocation. Climate change and changing rainfall patterns further exacerbate the problem. For example, though Sri Lanka doesn't have chronic water scarcity issues, seasonal water scarcity problems due to climate change occur. Many countries in South Asia lack proper irrigation infrastructure, including canals, reservoirs and pumping stations. The existing infrastructure is often outdated and poorly maintained, leading to water losses

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<sup>11</sup> [https://www.gdn.int/sites/default/files/WP/WP68-SA-Irrigation-Water\\_64f.pdf](https://www.gdn.int/sites/default/files/WP/WP68-SA-Irrigation-Water_64f.pdf)

and inefficient water distribution. Insufficient investment in new infrastructure also hinders the expansion of irrigation coverage.

It is also found that weak governance and institutional frameworks hamper effective irrigation management. Inefficient water allocation systems, corruption, lack of coordination among various government agencies and inadequate enforcement of regulations undermine the effectiveness of irrigation policies. For example, in Sri Lanka, water resources are managed by multiple government institutes and departments. Water usage is split between drinking and sanitation requirements, agriculture, power generation, construction, industries and the tourism sector. These sectors have separate objectives and are governed by different government institutes and policies. However, a holistic approach to allocating water among different uses is not available and policy coordination between different sectors using water is very low. For example, the irrigation department regulates water use for cultivation needs while the power sector regulates water use for power generation. When decisions for using water are not made in collaboration, water use is not maximized. Also, the use of wastewater for industrial use and circular water management practices are yet to be implemented. This is mainly due to the absence of a water use policy.

Overexploitation of groundwater is a severe issue globally. Excessive extraction of groundwater for irrigation purposes has led to a decline in groundwater levels in many parts of South Asia<sup>12</sup> with unregulated pumping and inadequate monitoring of groundwater resources contributing to overexploitation and depletion of aquifers. This poses a long-term threat to sustainable irrigation and agricultural production.

Nearly 80% of the water used in rural areas is from groundwater sources in Sri Lanka. Further, groundwater whose use is managed by the Water Supply and Drainage Board is used for small-scale agriculture and commercial and industrial use. However, adopting conservation measures has been lacking in the absence of a proper groundwater policy. Further, given different sectors do not invest in production practices that are water conserving (e.g. cultivation practices that use less water, etc.) inefficiencies in water use have mounted. In particular, inefficient irrigation practices, such as flood irrigation or the use of outdated technologies, have resulted in excessive water consumption. The lack of modern irrigation techniques, such as drip or sprinkler irrigation, reduces water use efficiency and contributes to water scarcity.

With new developments, it is obvious that the current water management approaches cannot be continued in the future without a policy thrust toward high productivity and sustainable water resources. Therefore, addressing these irrigation policy issues requires a comprehensive approach that includes sustainable water management practices, investment in modern irrigation infrastructure, equitable water allocation mechanisms and improved governance and institutional frameworks. In Sri Lanka, The

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<sup>12</sup> <https://www.adb.org/sites/default/files/institutional-document/731791/adou2021bp-irrigation-issues-asia.pdf>

National Water Policy of 2000 is aimed at transferring the management of irrigation works to farmer organizations. A scheme of Participatory Irrigation Management (PIM) in the form of farmers working together with government irrigation agencies taking responsibility for irrigation systems management has been adopted in Sri Lanka for this purpose. The main purpose of PIM is to improve the productivity of irrigated agriculture, making the system perform efficiently and reducing government expenditure. Nevertheless, the problem of irrigation service provision cost cannot be solved without some form of a financial charge because the government is being burdened with increased management costs. (IPS, 2006). The introduction of irrigation charges has been proposed many times and even attempted on a pilot scale in the past but without success. A major factor behind this failure is the socio-political setting in which there is the strongly held view that water is a gift of nature or a public good in economic terms. The inherent bureaucratic inefficiency of state institutions that collect and utilize the irrigation charges was also partly instrumental in the failure of this initiative. (World Bank, 2003). Hence, the long-run solution to the problems of irrigation water use efficiency, equity, and cost recovery should focus on combining participatory management with land-based irrigation charges. (IPS, 2015).

This type of policy revision can be coupled with the introduction of water-saving irrigation technologies for marginalized people who may be affected by such a major policy revision. These could include, for example, the introduction of solar-powered drip irrigation, the promotion of agro-wells, rainwater harvesting to increase water use efficiency and the enhancement of the income levels of farmers in water-scarce areas. These can also be considered adaptation strategies to minimize the climate change impacts on the agricultural sector. On the other hand, the use of irrigation water (or irrigated land) in such a way that maximizes economic returns is one major requirement as is eliminating the existing policy constraint which ensures irrigated land is confined to rice production which prevents maximizing returns on irrigation investment. Some fruit and vegetable enterprises with export potentials offer alternative uses for less productive irrigated rice lands in the low country dry zone. However, achieving such a change would face severe socio-political resistance.

### ***Fertilizer policy***

Fertilizer policies in South Asia aim to ensure the availability, affordability and sustainable use of fertilizers in the agricultural sector. Promoting the efficient and effective use of fertilizer has emerged as an important target of policies and programs in recent decades. The liberalization of the fertilizer sector over the years has significantly improved the availability of fertilizer in South Asia yet it has not necessarily succeeded in ensuring efficient supply and fair prices for farmers (Mujeri, et al., 2013). Many countries in South Asia implement fertilizer subsidy programs to make fertilizers more affordable for farmers, to promote fertilizer use and thereby increase agricultural productivity (See the Table 11 for the case of Sri Lanka). Over the years, these subsidies have taken different forms, such as direct subsidies on fertilizer prices, subsidies on specific nutrients, cash grants, etc. However, the effectiveness of subsidy

programs is often debated, as they can lead to inefficiencies, distortions and health and environmental concerns (Thibbotuwawa, 2010). As well, fertilizer subsidies have put heavy pressure on government budgets while leading to serious distortions in fertilizer consumption (Mujeri, et al., 2013).

Despite the evident problems, the abolition of fertilizer subsidies is unlikely in South Asian countries and such attempts in countries such as Bangladesh, Nepal and Sri Lanka have failed due to economic and/or political considerations (Kishore, et al., 2021).<sup>13</sup> There are instances in Sri Lanka and India where the subsidies were directed only to urea leaving Phosphorous (P) and Potassium (K) fertilizer prices untouched. However, there are several successful cases of removing subsidies leading to more efficient and sustainable fertilizer use. For example, the removal of subsidies in New Zealand helped to reduce fertilizer use and led to environmentally beneficial changes in land use. Also, the countries such as the Philippines and Japan have shifted the focus toward standard-setting, quality regulation and training away from price and subsidy policies (Weerahewa, et al., 2021).

South Asian countries often promote domestic fertilizer production to reduce dependence on imports and enhance self-sufficiency. Governments may provide incentives and support for local fertilizer manufacturing, including tax benefits, subsidies and research and development initiatives. However, many countries in the region including Sri Lanka continue to rely on imported fertilizers to meet their agricultural needs. Many governments in South Asia have established quality control mechanisms to ensure the availability of standardized and quality fertilizers in the market including setting quality standards, conducting quality testing and enforcing regulations on fertilizer imports, production and distribution. However, still, there are serious gaps in the implementation of these policies. Recent policies have focussed more on promoting environmentally sustainable fertilizer use practices such as slow-release and controlled-release fertilizers, implementing precision agriculture techniques and encouraging the adoption of nutrient management practices that minimize nutrient losses to the environment. Agricultural extension services provide guidance and recommendations on appropriate fertilizer use, dosage and application methods to promote efficient and judicious fertilizer use.

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<sup>13</sup> Bangladesh abolished fertilizer subsidies in 1992 and reinstated them in 2001. Similarly, Nepal did not have fertilizer subsidies between 1997–98 and 2008–09. Sri Lanka had no fertilizer subsidies from 1990 to 1994 and had subsidies only for urea from 1997 to 2005.

**Table 11: Evolution of fertilizer subsidy policy in Sri Lanka**

Year	Activity
1962	The fertilizer subsidy program was introduced for paddy at a fixed rate for urea, sulphate of ammonia (SA), muriate of potash (MOP), and triple super phosphate (TSP).
1971	The Ceylon Fertilizer Corporation has become a monopoly of the fertilizer importation process with an imposed ban on importing fertilizer for the private sector.
1975	The fertilizer subsidy program was expanded for all crops.
1977	The ban on importing fertilizer for the private sector was removed.
1978	A uniform subsidy scheme was introduced for all crops and the subsidy rates were varied according to the type of fertilizer. The National Fertilizer Secretariat has become the responsible authority for administrating the subsidy program.
1979	Subsidy rates were revised to 85 percent for urea and 75 percent for other fertilizers.
1983	Fixed fertilizer price was introduced.
1988	The subsidy program for particular fertilizer types (Sulphate of Ammonia, Rock phosphate) was removed.
1990	Fertilizer subsidy was removed for all agricultural sectors due to the heavy burden on the government budget.
1994	The subsidy for SA, Urea, TSP, and MOP was reintroduced at a fixed price.
1996	The subsidy for SA was eliminated.
1997	The fertilizer subsidy was limited only to urea with the removal of TSP and MOP.
2004	Fertilizer was supplied at a fixed retail price until December 2005.
2005	'Kethaka Aruna' program was introduced. The subsidy was limited to the main fertilizers for paddy (nitrogen, phosphate, and phosphorus) in their straight form.
2006	Tea, rubber, and coconut smallholder farmers (with less than five acres of land) became eligible for the fertilizer subsidy.
2009	The fertilizer subsidy policy was coupled with a paddy procurement policy, which required farmers to supply a fixed portion of paddy to the government at a pre-specified price below the market price.
2011	The Kethata Aruna program was extended to provide 50 kg fertilizer bags for Rs.1200 for all crops.
2016	Rs.25000 allowance provided to paddy farmers under the fertilizer subsidy program per 1 ha of land and two seasons.
2020	From mid-2020, fertilizer was provided free of charge for paddy up to a cultivation extent of 5 acres until the banning of 2021.
2021	The ban on the importation of chemical fertilizers, pesticides & herbicides by the Imports & Exports (Control) Regulation No 07 of 2021 on May 06, 2021, was imposed and On November 30, 2021, the ban on the importation of chemical fertilizers was removed.

Sources: Institute of Policy Studies of Sri Lanka (2022)

## **Seed policies & regulations**

### **Box 5: Evolution of seed policies and regulations in Sri Lanka**

Until the late 1980s, seed production in Sri Lanka was handled solely by the government with challenges of lack of financial resources and inefficient management of government seed farms. The private sector started to import seeds from 1984 and to produce seeds in the 1990s. The government introduced the National Seed and Planting Material Policy in 1996 to establish viable seed enterprises for local farmers and help them access high-quality seeds and planting materials. It provided guidelines related to the varietal development and release, commercial seed production and marketing, importation of quality seed and planting materials and certification and quality promotion. Yet, this was not entirely successful. While the privatization led to increased use by small farmers of more productive improved hybrid varieties though the affordability and accessibility of these varieties quality problems remained (Udakumbura, et al., 2002).

The government enacted the Seed Act No 22 of 2003, to regulate the quality of seed and planting materials to safeguard farmers as well as the seed handler from malpractices. The importation of seeds and planting materials was regulated through the Plant Protection Act, No, 35 of 1999 which dealt with sanitary and phytosanitary issues and farmers' rights. This act was intended to ensure farmers' access to high-quality seeds from domestic as well as foreign sources. The Seed Certification and Plant Protection Centre (SCPPC) and the Seed and Planting Material Development Centre (SPMDC)-are now responsible for seed production, marketing and distribution in Sri Lanka. Despite many efforts to increase the local availability of quality seed and planting materials, local production has been insufficient to meet the requirement (Hirimuthugodage, 2014).

Seed policies in South Asia aim to ensure the availability of quality seeds, promote seed industry development, and safeguard farmers' interests. Seed certification and quality control, seed production and multiplication, seed variety registration and protection, seed distribution and market regulation and seed sector regulation and coordination are the main aspects of the seed policies and regulations in the region. With the liberalization of the seed industry, private sector involvement in seed production, importation and marketing has greatly increased in South Asia. However, the existing policies and regulations haven't been updated sufficiently to ensure that they reflect recent developments in both technology and trade (FAO, 2020). In practice, the progress of this updating varies widely across the region; some countries have completed it, some are working on it now, while others have not yet started. For example, in India, the original Seeds Act (1966) was updated with new regulations several times but needs more substantial revision. Similarly, in Nepal, regulations to implement the 1998 Act were only passed in 2013, while Pakistan amended its 1976 Law in 2015 with a limited focus on introducing flexibility to the seed market. In Sri Lanka, no substantial regulations have yet been made under the 2003 Act (See Box 5). These have resulted in an overregulated seed system in which the public sector which lacks capacity retains its monopoly mandate to carry out research and develop new varieties while restricting the role of the private sector to develop seed varieties and sell them to farmers.

## ***Agriculture credit policy***

Agriculture credit policies in South Asia are designed to facilitate access to affordable and timely credit for farmers and agricultural enterprises. These policies aim to support agricultural development, enhance productivity, and improve farmers' livelihoods. Governments in South Asia establish or promote specialized agricultural credit institutions such as agricultural development banks, rural credit cooperatives and microfinance institutions to cater specifically to the financing needs of farmers. Governments of South Asian countries often provide interest rate subsidies in the form of direct interest rate concessions through public banks or interest rate buydowns provided to banks and financial institutions to make agricultural credit more affordable for farmers. Central banks in South Asia often provide refinancing facilities to commercial banks and financial institutions that lend to the agricultural sector. Additionally, targeted loan programs are implemented to meet specific needs, such as crop production, livestock development, irrigation and farm mechanization. However, small farmers currently face numerous challenges that limit their ability to integrate into agriculture value chains, including inadequate or costly finance for funding working capital and capital expenditure requirements due to traditional lending processes that require documentation, including collateral, that many farmers cannot provide (ADB, 2014).

### **Box 6: Agriculture credit policies in Sri Lanka**

The history of government intervention in providing credit for the rural sector in Sri Lanka goes back to the enactment of the Co-operative Credit Societies Ordinance in 1911 (Ministry of Justice, 2016). The commencement of the New Agricultural Credit Scheme in 1967 with the involvement of commercial banks represented a milestone in providing credit to farmers. Initially, the government's credit policy aimed to provide concessionary credit to the paddy and food crop growers. The credit policy of the government further broadened in later stages especially under the open economic policy after 1977. The conceptual changes in supplying credit to the rural economy by the Central Bank of Sri Lanka follow the objectives of assuring cost-effective, less cumbersome credit facilities at low-interest rates to the lower-income classes. It further focuses on popularizing micro-finance for the development of the rural sector since low income farmers were not able to easily meet their credit needs from formal commercial banks (Weerahewa, 2017).

Farmers' ability to access credit at concessionary rates has increased considerably over the years due to these initiatives. However, the benefits are still not available to farmers in less-developed areas with poor infrastructure (Chandrasiri, 2006). Also, most banks and financial institutions are reluctant to offer credit schemes for farming communities based on the sector's high risk since agriculture is sensitive to vulnerabilities of weather conditions and other external factors. Further, issues related to land and property rights and ineffective markets has led to credit-related problems such as a lack of collateral in the farming community (Silva, 2021). Also, the high default rates coupled with the absence of a strict enforcement mechanism to recover debts and writing off unpaid agricultural loans - due to political sensitivities - have aggravated existing challenges in rationalising credit policies.



## ***Agricultural Research and Extension Policies***

Agricultural research and technology transfer in South Asia faces several challenges that hinder its effectiveness and impact. These include lack of funding, poor coordination and collaboration, weak infrastructure, limited human resources and poor technology adoption (Stads, 2019). In many South Asian countries, agricultural research and extension receive inadequate funding compared to other sectors. Insufficient financial resources constrain the capacity of research institutions to carry out comprehensive and innovative research programs. Limited funding hampers the development and adoption of advanced technologies and practices. There is often a lack of coordination and collaboration among various agricultural research institutions. Limited sharing of knowledge, data, and research findings impedes the effectiveness of R&D and prevents the effective transfer of technology to farmers. Weak infrastructure facilities and limited human resources are also significant concerns in the South Asian region. Many agricultural research institutions in South Asia suffer from inadequate infrastructure, outdated laboratories, limited research facilities and a shortage of qualified human resources. This affects the quality and efficiency of research activities, making it challenging to conduct experiments, analyze data and develop innovative solutions. Investment in modern infrastructure is necessary to enhance the R&D capabilities of these institutions. A brain drain, where talented researchers migrate to other countries for better opportunities, exacerbates the problem. Strengthening capacity-building programs, providing competitive salaries and fostering research career development can help attract and retain skilled professionals.

South Asia has a large number of smallholder farmers, many of whom are located in remote and rural areas. Extension services often struggle to reach these farmers due to inadequate infrastructure, poor road connectivity and limited resources. The lack of accessible and timely information prevents farmers from benefiting from extension services. Insufficient resources result in inadequate training, outdated equipment and a lack of investment in new technologies, hindering the effectiveness of extension programs (Stads, 2019). Also, extension services in South Asia often suffer from a shortage of qualified and trained extension workers. Insufficient staff and high workloads limit the capacity to provide personalized advice and support to farmers. Additionally, the lack of continuous professional development opportunities hinders the skill enhancement of extension workers. While information and communication technologies (ICTs) have the potential to enhance extension services, their adoption in South Asia remains limited. Lack of access to affordable and reliable internet connectivity, as well as limited digital literacy among farmers, have restricted the use of digital tools for extension purposes.

### **Box 7: Agriculture R&D policies in Sri Lanka**

In Sri Lanka, a National Agricultural Research Policy (NARP) was formulated in the early 1980s to foster a public national agricultural system that was designed to ensure demand orientation, client orientation and high quality in its research and dissemination. However, the resulting national agricultural research system (NARS) is essentially government-centered, and not successful in commercializing agriculture and promoting regional specialization and vertical diversification. There is a need for enhancing agricultural research and technology by increasing budgetary and human resources allocation with a focus on much broader aspects of livelihood improvement, rural development, food security and agro-based industries in order to properly reform policies relating to technology generation (IPS, 2015). Investment in agricultural research was on an upward trend during the green revolution starting around the 1970s. This investment started declining with the first introduction of liberalization in 1977 and continued on a negative trend thereafter (IPS, 2008). In this setting, the remaining reduced investment was allocated to research on major crops such as rice discouraging diversification into high-value agriculture.

NARS is chiefly oriented to crop-based research, and therefore has limited scope for research in cross-cutting issues such as agroecology, climate change and environmental impacts. There is often a lack of coordination and collaboration between agricultural research institutions (national) and extension organizations (provincial). Currently, extension activities of the field crop sector are primarily managed by several departments under the Ministries of Agriculture of the Provincial Councils and by the Mahaweli Authority of Sri Lanka. In the spice sector, extension services are provided by the Department of Export Agriculture. In addition, there are few semi-government agencies, national departments and research institutes providing extension services in the plantation sector. Livestock services (veterinary services) are implemented by departments under the Ministries of Agriculture of the Provincial Councils. As well, several private and civil society service providers engage with farmers to deliver advice on various technical subjects. Thus, a common criticism of Sri Lanka's agricultural extension services is that it is supply driven with only a limited focus on farmers' needs and aspirations.

### ***Pricing and marketing policy***

Governments in South Asia often provide price support mechanisms and subsidies to protect farmers from price volatility and ensure stable incomes. These policies may involve minimum support prices (MSPs), direct procurement from farmers and input subsidies. However, the effectiveness and efficiency of price support systems vary across countries and there are concerns about the fiscal burden and potential distortionary effects on markets. Reforms were adopted by most South Asian countries to liberalize the agriculture sector with reductions in government support particularly after the 1980s (Samaratunga, et al., 2019) This was effected not only to reduce the fiscal burden of the producer and consumer subsidies but also because interventionist

policies had not achieved their stated objectives. The impacts of pricing and marketing policies have not supportive of crop diversification and export expansion though they did support the early policy objectives of import substitution and self-sufficiency (Samaratunga, et al., 2019).

Nevertheless, marketing is the biggest issue that agricultural producers in most South Asian countries face. Even though the domestic market for high-value crops is growing in South Asian countries, it is relatively limited. The producers in most of the South Asian countries including Sri Lanka find it difficult to cater to such markets due to a multitude of reasons such as the inability to supply continuously in larger quantities due to small scale of operations, weak marketing channels, the poor transmission of quality and other market signals, exploitation by middlemen exploitation, poor infrastructural facilities for transport and storage, etc. (Weerahewa, et al., 2015).

#### **Box 8: Agriculture marketing policies in Sri Lanka**

In Sri Lanka, state intervention in agricultural marketing has been progressively declining. However, successive governments have given high priority to food security as it relates to the paddy/rice sub-sector with most of pricing and marketing interventions biased towards this sector. For example, the Paddy Marketing Board Act, No.14 of 1971 was designed to establish to carry out the functions of purchasing, processing, selling and distributing paddy (Lawnet, n.d.). The Board was also given the authority to fix or change the guaranteed price for different varieties or different grades of paddy after consultation with the Commissioner of Agrarian Services.

During the open economy period prevailing from 1978, this support price and state procurement policy were abandoned. Governments reduced intervention in local purchases with the aim of creating a competitive market that promoted economic efficiency. Parallel to the open market policy in the domestic market, the government of Sri Lanka adopted an increasingly liberal agricultural trade policy internationally. Currently, agricultural marketing is a private sector operation except for necessary government intervention during market failures especially during the best-performing years and the bad-weathered years (Weerahewa, et al., 2015). Other than this, government intervention has occurred during global crises such as global recessions, pandemics and local economic crises. The main policy instrument that the government of Sri Lanka impose is import tariff adjustments together with certain trade restrictive mechanisms such as the use of Import Control Licenses (ICLs) and complete import bans for local products imposed to protect domestic farmers. Special commodity levies are being imposed on food commodities periodically (Wijesinghe, 2021).

Nevertheless, there has been constant public pressure to create dedicated agencies for procuring agricultural produce at guaranteed prices with a majority of the general public believing that government agencies should actively engage in providing marketing services to smallholders (Weerahewa, 2017).

## ***Climate change policy***

South Asian countries have been actively working to develop and implement climate change policies to address the impacts of global warming and promote sustainable development. Each country in the region has its own set of policies and priorities based on its unique challenges and circumstances (Mbah, et al., 2022). There are some common areas of focus in climate change policies in South Asia. Many South Asian countries have developed national climate action plans or nationally determined contributions (NDCs) under the Paris Agreement. These plans outline the country's targets and strategies to mitigate greenhouse gas emissions and adapt to the impacts of climate change. South Asian countries are increasingly investing in renewable energy sources, such as solar, wind, hydro and biomass, to reduce their dependence on fossil fuels and curb emissions. Implementing energy efficiency measures in various sectors, including industry, transportation and buildings, to reduce energy consumption and greenhouse gas emissions is a priority in the region. Some of the measures in the transport sector to reduce emissions from the transport sector include encouraging the use of public transportation, promoting electric vehicles and improving infrastructure. Promoting afforestation and reforestation projects have been implemented to increase forest cover, enhance carbon sequestration and protect biodiversity.

Also, strategies have been developed to enhance resilience to climate change impacts, such as extreme weather events, rising sea levels and changing rainfall patterns. It has been revealed that with adaptation, the vulnerability of agriculture to climate change can largely be reduced (Rosenzweig & Parry, 1994). Many agricultural adaptation options have been suggested in the literature which encompass a wide range of micro-level options such as crop diversification, inter-cropping, crop rotation, altering the timing of operations and integrated pest management. Adaptive measures also include market responses such as income diversification and credit schemes and institutional changes. Government responses include removal or preservation of subsidies and the improvement of agricultural markets and technological developments (Mendelsohn, et al., 2001). Moore fundamental changes could include improving the stability and adaptability of crop varieties through genetic improvement. Techniques such as an efficient use of conventional breeding, as well as more sophisticated molecular/mutation breeding, are available for this purpose. Cropping system-based technologies that are centered on the promotion of crop varieties that have adapted to suit changing climates is another area where research needs to be stepped up, particularly in the case of subsidiary food crops that are grown in vulnerable areas.

There are currently considerable efforts being made by South Asian countries to strengthen disaster risk reduction and management capabilities to prepare for and respond to climate-related disasters, such as cyclones, floods and droughts. Raising public awareness and promoting climate education to engage citizens and stakeholders in climate change mitigation and adaptation efforts and seeking

international climate finance and funding to support climate change mitigation and adaptation efforts are also key strategies. Yet, South Asian countries often face challenges in implementing climate change policies and making effective adaptations to climate change impacts due to a lack of information; poor technologies, limited financial resources, poor policy and governance structures and insufficient institutional and coordination capacities.

## **5. Summary, conclusion, and the way forward**

South Asian countries have undergone a rapid transition in the sectoral composition of GDP with agriculture's share dropping persistently. However, the structural transformation in South Asian countries has not ensured a contraction of the agricultural labour force on par with the contraction of the share of the agriculture sector in GDP. While South Asian countries have different development and structural transformation stages with country-specific economic characteristics, agriculture is still a significant sector contributing to well-being. The low output and high labour force participation imply there remains considerable scope for raising productivity within and outside the farm sector. In addition, the overrepresentation of the service sector in South Asian economies has increased the vulnerability to economic shocks. Underdeveloped industrial sectors mean that the service sector has typically been absorbing much of the labour force leaving the agriculture sector. Governments need to foster opportunities to increase productivity by mobilising resources away from agriculture to higher-value sectors by removing market distortions that hamper innovation and investment.

Despite the positive impact of trade on growth, labour market outcomes and poverty alleviation its effect varies sectorally and spatially, indicating the unequal distribution of the dividends of free trade. Also, reduced agricultural tariffs have not generally led to the successful development of agricultural industries based on comparative advantage mainly due to distortionary subsidies, the inability to invest in meeting sanitary and phytosanitary measures and other non-tariff barriers applied to South Asia's agricultural and food exports. Intraregional trade is particularly weak in the South Asian region and the South Asian countries are not participating in global value chains (GVC) to the extent of its East Asian counterparts such as Vietnam and Singapore. Also, South Asian countries have low product complexity implying that the countries produce primary or low-tech manufacturing products. The needed diversification into high-tech manufacturing - which is a necessary pathway to economic resilience – has yet to occur. Consequently, the South Asian region has a trade deficit with the rest of the world and each South Asian country has faced a persistent current account deficit in recent years.

Despite the structural transformation and liberalization of trade, agriculture remains a significant sector in South Asia, employing a significant portion of the population and

contributing to food security and economic growth. The region is known for its production of diverse crops including cereals such as rice, wheat and maize, pulses, sugarcane, fruit, vegetables and spices. The agricultural outputs have recorded a dramatic increase in South Asia during the past six decades. This growth has occurred, especially through the expansion in arable land, crop intensification and yield growth (due to technological advancement). Yield enhancement has been attributed to the replacement of short-duration rain-fed varieties with long-duration irrigated high-yielding varieties. This has helped meet the growth in demand resulting mainly from population growth and modest growth in per capita calorie consumption. However, the share of arable land is declining slightly or remains flat while per capita availability of arable lands is falling as land becomes more and more infertile and fragmented. Also, because the policy focus has largely been on increasing the supply of cereals, the staple of the Asian diet, the yield levels of most other domestically grown food crops have stagnated for more than a decade at unimpressive levels even by developing country standards. Therefore, domestic production will fall short of meeting national requirements even under present levels of per capita food consumption, highlighting the need for reconsidering land use priorities.

Smallholder farmers play a crucial role in South Asian agriculture, with most farmers operating on small landholdings. However, small-scale farmers often face several challenges related to limited access to resources, including land, irrigation, finance, technology and market opportunities. The low output and high labour force participation implies that the scope for increasing productivity is considerable for many South Asian economies.

However, South Asia is highly vulnerable to the impacts of climate change, which poses significant challenges to agriculture. Extreme weather events, including droughts, floods, heatwaves and erratic monsoon patterns, are having adverse effects on crop yields, livestock, and overall agricultural productivity thus adding to the pressure to re-evaluate agriculture policies toward more productive and resilient farming systems that are more focused on making the best use of locally available resources. Yet, there are significant gaps in climate change adaptation and resilience-building. Addressing these gaps are important priority for the agricultural sector in the region.

South Asia performed remarkably well in poverty reduction over the years, yet, the region accounts for one-fourth of people living in extreme poverty worldwide. Food security in South Asia remains a significant challenge despite the region's substantial agricultural potential. South Asia is home to a large and diverse population, with millions of people facing issues of hunger, malnutrition and inadequate access to nutritious food. With nearly a quarter of the world's population, achieving robust economic growth while ensuring the food security and livelihoods of the populous rural sector is a significant policy challenge for the South Asian region. Limited economic opportunities for its growing population, an education and skills gap, inadequate infrastructure, agriculture-related challenges contributing to rural poverty, weak

governance and corruption issues, social exclusion and marginalization and conflict and political instability have been the major structural factors that contribute to continuous poverty in the region. Apart from the decline in the share of agricultural labour in South Asia the region's agricultural labour force has, over time, indicated certain noticeable characteristics such as increased participation of women and an increased reliance on a mature age population in response to a progressively falling rural population and increased urbanization, coupled with out-migration.

Thus, to ensure food security and specifically to eliminate poverty in rural areas of the region, retaining agriculture workers within the sector and ensuring gender equality are of utmost importance. The establishment of laws and systems of governance that ensure greater profitability, progressive modernization and equal access to resources including land, seeds, training, irrigation facilities and fertilizer, especially for women, can improve the productivity of agriculture. Those will help improve prospects for raising existing female workers' income while motivating youth and men to remain in agriculture rather than migrating out in search of stability elsewhere. The social benefits of such stability in terms of community resilience and cohesion can be large. The adoption of modern agricultural technologies in South Asia, including mechanization, precision farming and digital agriculture has been slowly progressing at different rates in different countries in the region. However, there is still a significant gap between South Asian countries and developed countries in terms of technology penetration and usage. Limited access to finance, inadequate infrastructure and lack of awareness and technical knowledge among farmers are some of the main barriers to technology adoption in the region. Similarly, the scale of the farm operation, especially in Sri Lanka has impeded mechanization and adoption of technology in agriculture.

South Asia has faced multiple shocks in the past couple of years, including the COVID-19 pandemic and the Ukraine war which had a strong negative impact on food security and people's real incomes. Inflation in South Asia rose in the aftermath of the pandemic, increasing income inequalities and pushing more people into poverty. Further, the education and health outcomes were set back for millions of vulnerable people eroding the human capital in the region. In addition, the severe macroeconomic crisis and with it less favourable exchange rates, high inflation, reduced tourism and remittances incomes and debt default in countries such as Sri Lanka and Pakistan have already caused acute shortages and spikes in the prices of essential products, including food, fertilizer and fuel causing major disruptions to agricultural production and rural livelihoods. In light of these developments, to mitigate the challenges facing agriculture in South Asia, significant policy reforms are required.

Policy Area	Needed reforms
Land	<p>Reforming current national land use policies and regulations to foster a shift from low-value to high-value agriculture, addressing the issues of low productivity and efficiency, is a timely requirement. These policy reforms should essentially cover strict enforcement measures of regulations on land use such as limiting agricultural land uses only to suitable land classes, amending regulations on soil conservation to prevent improper land uses, identifying activities leading to the degradation of land and initiating conservation practices in susceptible areas, preventing land encroachment, especially in environmentally sensitive areas. Rationalizing land ownership for efficient use of land resources by revising the dated regulations on the ownership and removing restrictions on transactions of such lands to increase access to land by efficient farmers must be considered a top priority. There is a strong need to execute an integrated and consistent approach to managing a country's land resources by strengthening the organizational and institutional framework for land management by bringing all the scattered institutions with duplicating responsibilities under one umbrella body. Such policies are expected to aggregate small inefficient land plots owned by poor farmers and thereby greatly increase productivity and efficiency of land use. However, policies have to be implemented to ensure those leaving the agricultural sector could be employed elsewhere.</p>
Irrigation	<p>With new developments, it is obvious that the approach to water management over the past cannot continue with a policy thrust toward high productivity and sustainable water resources. Hence, future policy reforms should essentially deal with these two issues to ensure efficiency and long-run sustainability. The main purpose of Participatory Irrigation Management (PIM) is to improve the productivity of irrigated agriculture, making the system performance efficient and reducing government expenditure. Nevertheless, the problem of irrigation service provision cost cannot be solved without some form of a charge. Hence, the long-run solution to the problems of irrigation water use efficiency, equity and cost recovery seems to lie with a suitable combination of participatory management and land-based irrigation charges. Nevertheless, three major areas need to be systematically looked into before launching such an attempt. These are the administrative determination of water charges, determining the suitable institutional arrangement for implementation and evaluating the consequences of such an initiative. This type of policy revision could be coupled with the introduction of water-saving irrigation technologies for marginalized farmers who would be affected by such a major policy revision. This could include for example, the introduction of solar-powered drip irrigation, promotion of agro-wells and rainwater harvesting to increase water use efficiency and to enhance the income levels of farmers in water-scarce areas. These can also be considered adaptation strategies to minimize climate change impacts on the agricultural sector.</p>



Fertilizer	<p>As fertiliser is an essential input of agriculture, strong fertilizer-related policies are vital for any national effort aimed at increasing agricultural production and productivity. Fertilizer policy reforms need to be not only fiscally and environmentally sustainable, but also politically feasible. Adopting a 'sustainable intensification' approach is needed that anticipates a gradual reduction of the use of chemical fertilizer combined with good agricultural practices that will maintain or enhance yields while simultaneously protecting and improving long-term soil health. This can be done through a combination of instruments under effective fertiliser policies and comprehensive well-structured action plans. The instruments that can be imposed include promoting organic fertilizer through incentives and reward schemes; promoting good agricultural practices to avoid overuse of chemical fertilisers; taxing harmful chemical fertilizers; introducing technologies to maximize fertilizer use efficiency that include site-specific applications and precision techniques; reducing the subsidies on chemical fertilizer gradually and strengthening the fertilizer standards and enforcement of regulatory measures related to fertilizer, soil conservation, and food.</p>
Research and extension	<p>The current agricultural research system is essentially government-centered and has not been greatly successful in commercializing agriculture and promoting regional specialization and vertical diversification. Enhancing agricultural research and technology by increasing budgetary and human resources allocation, with a focus on much broader aspects such as livelihood improvement, rural development, food security, and agro-based industries is a necessary condition for policy reforms in research. Also, adaptive research emerges as very important in buying or acquiring foreign technology before it can be transferred successfully to different locations in a country. The traditional supply-driven process of technology generation needs to be changed to demand-driven technology development to cater to transformed markets and niche markets. Emphasis also needs to be given to promoting -particularly long-term - research on the utilization of unexploited indigenous genetic potential, especially fruit; aquatic plants and medicinal herbs; controlled agriculture (greenhouse and poly-tunnel technology); water-saving crop production techniques (solar power drip irrigation) and non-seasonal crop production and small and medium scale agricultural machinery. However, there can be a problem that only rich farmers can afford such technology, especially in the case of embodied technology such as machinery and hybrid seeds rather than disembodied technology such as agronomic practices. Consequently, the state has to play a role in ensuring the inclusion of all farmers.</p> <p>Both policy and institutional reforms are needed to bring R&amp;D, technology and extension under one umbrella while strengthening the role of public-private partnerships. Agricultural extension is under increasing pressure to become more effective, more responsive to clients and less costly to governments. Despite various attempts to reform the effective dissemination of agricultural technology, the process of reform has remained incomplete. The technology dissemination process through extension must be customized by strengthening existing extension approaches with adequate budgetary and human resources investments. Further, the present extension system which focuses on the</p>

	<p>production aspect needs to be restructured towards process and value chain approaches to improve competitiveness, strengthen business decision-making, and introduce diversification into processing and value addition. Establishing a demand-driven fee-levying extension system in addition to the conventional system, encouraging public-private partnerships in extension delivery and developing IT technology infrastructure to enable easy and speedy access to information by all stakeholders must be given careful consideration.</p> <p>Creating a dynamic data ecosystem that acts as a network of interactions – with government organizations, the private sector, and individuals who are producing and using development information – is a top priority in modern-day agriculture. The increasing urgency for more data literacy is a frequently heard demand. Data literacy includes creating more data producers, strengthening their ability to create quality data and enabling stakeholders to be better data users. In this way, hard-to-comprehend information can be put into a format that people can understand. Drawing data from different organizations and institutions into a common repository, enforcing common definitions and standards, creating visual representations of data and designing interactive websites and apps are just a few tools that can be used to make information more accessible and useful. With the highest level of resources, and ability to produce valuable tools to strengthen the economy, the private sector is also the least likely to make its data public. However private sector companies which are willing to contribute to such development attempts need to be identified. Those avenues that create close relationships between the public and private sectors must be explored to strengthen data sharing, especially through frequent public-private policy dialogues.</p>
Agriculture Marketing	<p>A state’s marketing policy has historically been limited to ad hoc procurement of a few products under a guaranteed price scheme. However, recent developments in agricultural markets indicate that markets are not readily available to absorb the produce at the time of harvesting and it has typically been left to organized traders to purchase at relatively low prices. This scenario of overemphasis on the importance of government intervention continues with little change. This situation has triggered the need for a new innovative practice of working with smallholders to improve their ability to face restructured market conditions by delivering knowledge, assisting in accessing capital and advising on food standards and enterprise planning. Even though there are certain innovations elsewhere that fulfill these consumer demands while effectively integrating the farmers into the supply chain, the lack of capacity to accommodate a large number of poor farmers has resulted in exclusion and marginalization. Hence, government policy should emphasize more on enhancing value addition and agro-based products among smallholder farmers and linking them with dynamic value chains.</p> <p>Development of marketing and allied infrastructure (trade facilitation) by international trade promotion and branding for primary and value-added products with export potential should be a top priority in agricultural marketing policy. Strengthening trader-farmer contracts is a critical intervention. Private sector investment in agriculture should be</p>

	<p>encouraged and the linkages between producers and the modern value chain actors should be facilitated. Technical, scientific and financial assistance should be provided to modernize and upgrade facilities to international standards, especially in the area of post-harvest management, good agricultural practices and food safety. Ensuring a predictable and transparent pricing and procurement policy instead of ad hoc policy changes is required to avoid market uncertainties and investor confidence. Need-based state intervention while maintaining market competition and rural infrastructure development is suggested. Maintenance of buffer stocks of essential commodities is useful to stabilize prices, consumption and food security.</p>
Climate change	<p>Recent policy and regulatory efforts have helped to fill some gaps in policy on climate change at the national level. However, climate change issues are yet to receive the due attention of policymakers at sector-level policies. This cannot be considered a favourable situation for a vulnerable region such as South Asia. This significant policy gap in climate change issues as they relate to agriculture needs to be addressed through carefully designed policies with the participation of policymakers, researchers and academia from both the government and non-government sectors. Increased irregularity of rainfall over time and increased variance of rainfall and temperature within cultivation seasons have been reported as crucial climatic variables for Sri Lankan agriculture with adverse implications on food security.</p> <p>In the context of an increasing population and vulnerability to food security, increased climatic variance and thereby instability of agricultural production, policy priority should be given to areas of agricultural research and food production enhancement. However, it should be noted that some of the climatic issues in the agriculture sector can be readily addressed by irrigation and technology policy reforms. Different adaptation techniques can be used to minimize the vulnerability to climate change, such as improving the stability and adaptability of crop varieties through genetic improvement and molecular breeding. Moreover, strategies are needed to strengthen farmers' abilities to manage risks such as by changing the cropping period to take advantage of changes to the weather and improved crop management through crop rotation, inter-cropping and integrated pest management.</p> <p>Growing water scarcity in irrigated areas and worsening uncertainty of rainfall in rain-fed agriculture are two major climate change consequences that can be tackled by improved water use management as suggested in irrigation policy reforms. State intervention to enhance both technical and institutional capacities for more efficient water management and conservation is therefore of vital importance. Improved moisture conservation, modern sustainable irrigation techniques such as solar drip irrigation, rainwater harvesting and recycling, efficient use of irrigation water and conservation agriculture are some avenues that need to be given careful consideration in policy reforms. Furthermore, redesigning credit and agricultural insurance instruments to properly transfer climate change risk needs future policy focus.</p>

Agricultural trade	<p>The way forward lies in successfully integrating with global manufacturing value chains. Globally, evidence indicates that countries are increasing integration even in agricultural and food value chains. Empirical evidence points to the importance of enabling trade policies for successful participation in the GVCs. Against this backdrop, there is a need for reforms to regional integration measures in South Asia - such as RTAs and existing tariff structures. Policy changes to remove distortions to incentives need phasing-in and complementary adjustment packages. In line with removing distortionary tariffs and non-tariff barriers, domestic land and agricultural marketing policies need to change. Institutional development, investment in quality assurance and accreditation and legal expertise in dispute settlement will be needed to circumvent trade-related issues. Anecdotal evidence also suggests that poor on-farm practices are largely the source of difficulties in meeting quality and consistency requirements for food trade, which are easily amenable through targeted extension advice and business practice improvements.</p> <p>In addition, it is necessary to identify producer groups affected by the policy changes and design and implement adjustment packages. Income supports smoothen the transition to another sector and training and education for skill development are also crucial adjustment measures. Institutional set-up and coordination between agencies are necessary to mainstream agricultural trade policies within broad national development goals. Tariff reforms, subsidy reforms, the introduction of adjustment packages, facilitating internal migration and skill development need multiple agencies. In addition, the governments of South Asian countries should have an agency to identify the necessary reforms and evaluate the benefits and costs of the reforms and the sectoral distribution of the costs. For example, the Australian Productivity Commission provides a useful precedence. Impact assessment is vital to designing adjustment packages that increase the political feasibility of reforms by smoothening the transition.</p> <p>Research and technological development are necessary to develop the food processing industry of South Asian countries. Although each government in the region faces a fiscal constraint, the burden of research funding and technological development disproportionately falls on the state. Thus, efficient use of funds to research institutes, repurposing the available funding to non-cereal crop production and processing, and public-private partnerships are necessary.</p>
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## Appendix:

Table A1:

Country	Main liberalization episode/s	Major policy reforms
<b>Afghanistan</b>	2001	<p>After 2001, a comprehensive set of Western liberal policies was implemented in Afghanistan. The Islamic Republic of Afghanistan officially joined the World Trade Organization (WTO) in July 2016, following an accession process that commenced on November 21, 2004. WTO membership has fostered stronger economic connections and significantly expanded trade opportunities with both regional countries and the global community.</p> <p>In the recent Afghanistan National Trade Policy (2019–2023)<sup>14</sup>, there is a prominent focus on transforming the productive sectors of the economy towards the production and export of high-value-added goods. This strategic shift aims to unlock the country's full export potential and plays a central role in shaping Afghanistan's economic transformation.</p>
<b>Bhutan</b>		<p>Over the years, Bhutan has transitioned from being a virtually closed economy in 1960 to one characterised by a notable level of openness, with a heavy reliance on a single market: India. India has consistently been Bhutan's largest trading partner, accounting for over 90 % of Bhutan's total export value and over 80 % of imports between 2000 and 2009. Bhutan has implemented tariff liberalization measures on imports from India and has developed a gradual reduction plan for peak tariff rates under the SAARC<sup>15</sup>.</p>
<b>India</b>	1991 (Attempts for systematic liberalising also happened in 1980s <sup>16</sup> )	<p>The five-pronged reforms in 1980, include, expansion of the open general licensing list (OGL), phasing-out of canalisation- the monopoly right of the government to import, export incentives, removal of industrial controls, and realizing exchange rate. The 1990s reforms are much deeper, moving away from “positive list” approach to “negative list’ approach. Major reforms include deregulation of industry, and reforms in external trade. Regulations on all intermediate inputs and capital goods were removed, while prohibitively high tariffs were taken down gradually. Non-tariff controls on consumer good</p>

<sup>14</sup> See Ministry of Industry and Commerce (2019): [https://moci.gov.af/sites/default/files/2020-02/Afghanistan%20NTP%2010\\_web.pdf](https://moci.gov.af/sites/default/files/2020-02/Afghanistan%20NTP%2010_web.pdf)

<sup>15</sup> See (Cheong et al., 2015)

<sup>16</sup> Panagariya (2004) noted that the 1980s reforms were deep and had an impact on the growth in the 1980. The 19080s reforms were “substantial yet half hearted”.

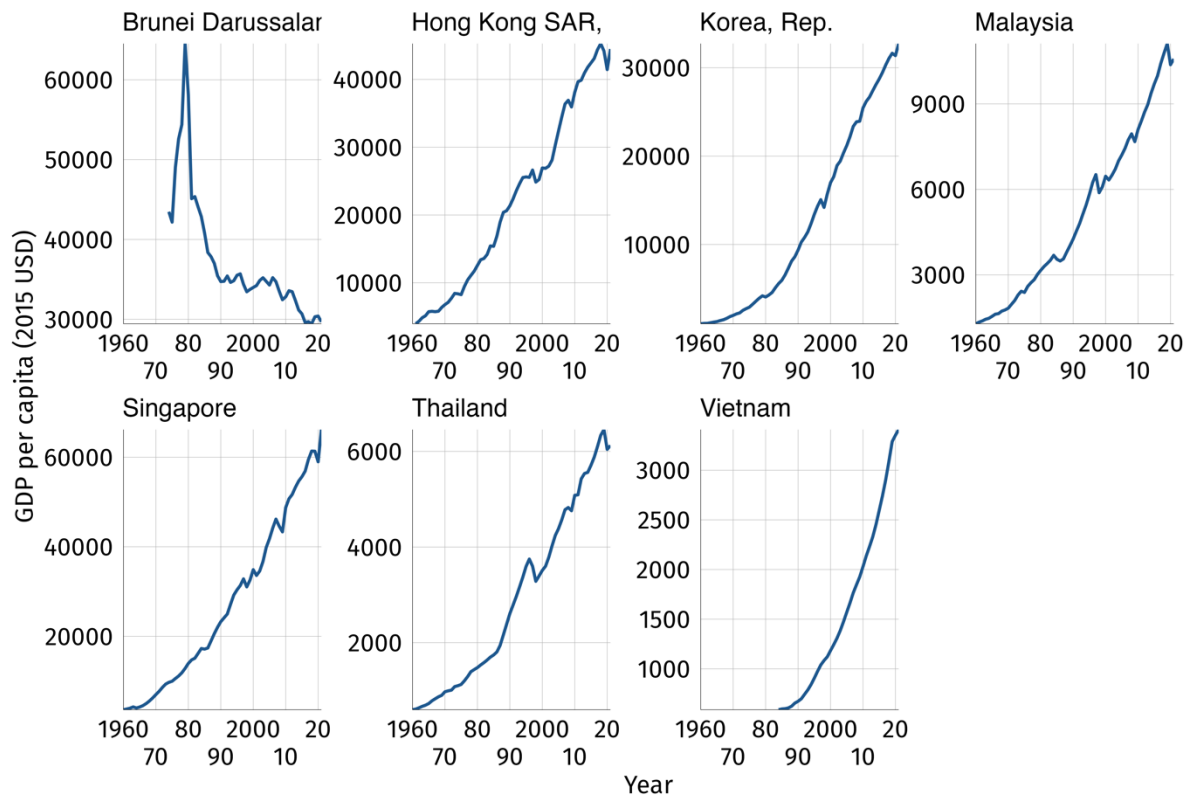


		imports were not removed until 2001.
<b>Maldives</b>		Maldives is an original Member of the WTO and former GATT and has also been an active member of the SAARC and its trade liberalization initiative; SAFTA, since its inception in 1985. Maldives national trade policies have been reviewed twice until 2009 and in 2012, Maldives embarked on a unilateral most favoured nation (MFN) tariff liberalization initiative, eliminating tariffs on approximately 31.5% of tariff lines. More specifically, Maldives signed a free trade agreement (FTA) with the People's Republic of China in December 2017, which covers trade in goods, trade in services, investment, and economic and technical cooperation. This FTA initially caters for duty-free imports for 70% of tariff lines, and at year end 2025, 95% of items will be duty-free.
<b>Nepal</b>	First liberal trade policy in 1992	In 1983, the initial trade policy was introduced with the slogan "Exports for Development." After an economic liberalization wave and the adoption of a Structural Adjustment Program, Nepal introduced its first liberal trade policy in 1992. This policy successfully eliminated various trade barriers, including the removal licensing requirements for exports, imports and the establishment of industries. Nepal joined the World Trade Organization (WTO) as its 147th member in April 2004. In February 2004, Nepal became a member of the Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC).
<b>Sri Lanka</b>	First wave-1978 Second wave-1991	Trade liberalisation, partial liberalization of financial markets, and replacement of food subsidies by food stamps were introduced in the first wave. In the second wave rigorous efforts for stabilization was taken which include reducing budget deficit. From liberalization front major step taken was, abolition of compulsory currency surrender requirement for the exporters <sup>17</sup> .
<b>Pakistan</b> <sup>18</sup>	June 1987 reforms	Most of the tariffs were taken down. Number of tariffs slabs were reduced from 17 to 10.
	1988-89	Economy wide simple average tariff reduced to 66.3 from 77.1 in early 1980s. Since 1988 successive governments of Pakistan followed liberalization reducing the maximum tariffs level to 45 % in 1997-98 from 225 % in 1986-87. Majority of the import controls were removed, and para-tariffs have been merged to statutory tariff regime.
	Tariff reform committee reforms since 1993	Tariff structure was simplified. Import surcharge levy of 10 % abolished. Maximum tariff level brought down to 65 %. Since 1997 maximum tariff level was further lowered.

<sup>17</sup> A rich account of liberalization attempts can be found in Athukorala & Jayasuriya (1994); Dunham & Kelegama (1995, 1998) and Kelegama(2000)

<sup>18</sup> See Khan & Ali (1998)

**Figure A1;**



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## Appendix 3: