

● TRADE ● insight



SUSTAINABLE INTENSIFICATION OF **AGRICULTURE**

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Sustainable agriculture for hunger free South Asia

SOUTH Asia is a laggard when it comes to nutrition and food security. The Global World Hunger Index (GHI) for 2017 reinforces this sad truth. Among 119 countries covered by the Index, the rankings of South Asian nations are dismal: Afghanistan (107), Pakistan (106), India (105), Bangladesh (88), Sri Lanka (84) and Nepal (72). The region is the worst performer among all other regions in the world.

About a quarter of the region's population suffers from hunger and malnutrition, while nearly 40 per cent of the world's undernourished population belongs to this region. The pace of progress to reduce the undernourished population greatly varies across the region with countries like Nepal, Maldives and Bangladesh making significant progress.

But there is a problem in South Asian agricultural practices, primarily based on high-yielding varieties of the 1960s and 1970s and excessive use of chemical fertilizers and pesticides. These practices, under the rubric of "green revolution technologies", are slowly degrading the soil and adversely affecting the biosphere. Agriculturists have realized that, in any case, productivity growth gained from such practices has reached a point of saturation and it may not be able to feed the ever-expanding population. To add to the woes, increased competition between agricultural and non-agricultural uses for land, water and natural resources is making food production even more vulnerable.

The silver lining on the horizon is the acceptance of practices that promote a marriage between sustainable environment and smart technology as the way to go. With the adoption of such a system, production and productivity can both increase, while at the same time keeping the environmental impacts under control. The Food and Agriculture Organization of the United Nations is promoting breeding of crop varieties that can withstand adverse conditions, such as salt-tolerant rice or drought-resistant sorghums and millets. These can bring even neglected land under cultivation. Soil nutrient cycling, through crop rotation and biomass recycling, can keep soil healthy. Integrated crop management strategies to control pests and diseases can discourage the use of harmful chemicals and still maintain soil fertility. Using rain water through drip irrigation methods makes for judicious use of water, a scarce commodity. Best of all, these techniques try to amalgamate old and traditional techniques with new discoveries for the sake of sustainability.

These technology-backed smart techniques are increasingly being referred to as the sustainable intensification of agriculture (SIA). It aims to produce more food with less impact on the environment by using innovative techniques. The idea is to change agriculture to increase food production with fewer inputs and with low impacts on environment and natural resources. It also emphasizes better management techniques and coverage of areas and communities that were left out by the green revolution. SIA presents an opportunity to South Asia to increase food production and subsequently reduce malnutrition.

However, there are also other pressing structural deficiencies in the region—poverty, inequality, and distribution failures—that restrict access to and affordability of food. These need to be addressed as well. That does not negate the need to end the dependence on green revolution technologies that have already proved unsustainable. They are unsustainable not just for the environment but also for productivity growth. Remember, it was productivity promises that led to the introduction of those technologies in the first place. Conventional agriculture needs, therefore, to be shifted to resource-efficient sustainable agriculture through appropriate plans and policies. ■

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WTO's Trade Facilitation Agreement enters into force

THE World Trade Organization's Trade Facilitation Agreement (TFA) has obtained the two-thirds acceptance of the agreement from its 164 members needed to bring the TFA into force.

On 22 February 2017, Rwanda, Oman, Chad and Jordan submitted their instruments of acceptance to WTO Director General (DG) Mr. Roberto Azevêdo, bringing the total number of ratifications over the required threshold of 110. The entry into force of this agreement, which seeks to expedite the movement, release

and clearance of goods across borders, launches a new phase for trade facilitation reforms all over the world and creates a significant boost for commerce and the multilateral trading system as a whole.

Full implementation of the TFA is estimated to slash members' trade costs by an average of 14.3 per cent, with developing countries having the most to gain, according to a 2015 study carried out by WTO economists. The TFA is also likely to reduce the time needed to import goods by over a day and a half and to export goods

by almost two days, representing a reduction of 47 per cent and 91 per cent respectively over the current average.

Moreover, once the TFA is fully implemented, developing countries are predicted to increase the number of new products exported by as much as 20 per cent, with least-developed countries (LDCs) likely to see an increase of up to 35 per cent, according to the WTO study.

Mr. Azevêdo said that this would boost global trade by up to US\$1 trillion each year, with the biggest gains being felt in the poorest countries.

The Agreement is unique in that it allows developing and least-developed countries to set their own timetables for implementing the TFA depending on their capacities to do so. A Trade Facilitation Agreement Facility (TFAF) was created at the request of developing and least-developed countries to help ensure they receive the assistance needed to reap the full benefits of the TFA and to support the ultimate goal of full implementation of the new agreement by all members. (www.wto.org, 22.02.2017) ■



India begins converting 106 rivers into waterways

INLAND Waterways Authority of India (IWAI) has begun the preparatory works on converting 106 rivers into National Waterways (NWs) by making them navigable. A total of 106 rivers across the country were declared national waterways by the government in April 2016 to be used to move freight cargo.

In the first phase, eight waterways are being considered for development. The states that the eight

NWs would cover include Bihar (NW-37, Gandak & NW-58, Kosi), Uttar Pradesh (NW-40, Ghaghra), West Bengal (NW-97, Sunderban), and Assam (NW-16, Barak).

According to a statement from IWAI, the Detailed Project Report (DPR) for these waterways are ready. The tender process for fairway development of two NWs, namely river Barak in Assam and Ghaghra in Uttar Pradesh respectively has been initiated. For Goa

waterways, the tenders for construction of jetties would be taken up shortly.

With just 0.6 per cent of India's freight transported through the inland waterway route despite vast network of rivers across its geographical corner that form about 20,000 km of navigable waterways, the need for developing additional National Waterway is essential. (<http://economictimes.indiatimes.com/>, 20.01.2017) ■

Sri Lanka works to remove technical barriers

SRI LANKA is setting up the first ever national level mechanism to overcome export quarantining and other technical barriers.

Minister for Industry and Commerce Mr. Rishad Bathiudeen informed that the Department of Commerce (DoC) is ready to set up a 'National Committee on SPS and TBT' to overcome their export compliance issues, specially related to sanitary and phytosanitary (SPS) measures and technical barriers to trade (TBT).

Minister Bathiudeen was addressing the press following the inauguration of DoC pioneering Colombo Info Session with World Trade Organization (WTO) experts for Lankan exporters, compliance officials and specialists on SPS and TBT. WTO Economic Affairs Officer Ms. Roshan Khan and WTO Trade and Environment Counsellor Mr. Erik Wijkstrom briefed the DoC further on the issue.

Around 22 per cent of Sri Lanka's annual exports are agricultural, at US\$2.5 billion.

SPS and TBT measures have a significant impact on international trade affecting Sri Lanka as these measures appear to be highly complex and increasingly challenging for exporters.

The newly planned SPS & TBT Committee under the DoC is a high level cross functional mechanism with no less than 14 institutions (ministries and specialised government institutions including the Agriculture Ministry, Customs, Quarantine Department, the Import Export Department etc.) getting involved. (www.lankabusinessonline.com, 21.02.2017) ■

Removal of Pak-Afghan transit trade hurdles sought



PAK-AFGHAN Joint Chamber of Commerce and Industry (JCCI) has asked the governments of both Pakistan and Afghanistan to remove hurdles to Afghan Transit Trade (ATT).

Addressing a meeting of Pak-Afghan Liaison Committee on transit trade, Senior Vice-President of the Pak-Afghan JCCI and Chairman of the Sarhad Chamber of Commerce and Industry Standing Committee on Railway and Dry Port, Mr. Ziaul Haq Sarhadi urged the leaderships of both the countries to end their differences to ensure business facilitation on both sides of the border.

The meeting decided that the involved stakeholders—Pak-Afghan Liaison Committee, Directorate, Transit Trade, Pak-Afghan JCCI and Peshawar-based Afghan Consulate—will submit a list of recommendations to remove impending factors in Afghanistan-Pakistan Transit Trade Agreement (APTTA) to the relevant agencies of respective governments.

Mr. Sarhadi said that ATT trade that has shifted to Bandar Abbas and Chabahar could be attracted to Pakistani ports by facilitating the business communities of both countries. He also called for addressing the grievances of the business community on the new trade agreement.

Mr. Sarhadi told the meeting that a lack of interest from both the governments and some political disputes

were badly affecting both Afghan Transit Trade and bilateral trade. He added that the business community was facing severe hardships due to non-review of the agreement for the last six years. He also requested for a meeting to review the new Afghan transit trade agreement through mutual consultations.

Meanwhile, According to Afghan officials, traders and transporters have suffered losses worth billions of rupees following the indefinite closure of the Pakistan-Afghanistan border. They said this at a news conference held at the Peshawar Press Club on 27 February.

They reported that more than 6,000 vehicles carrying goods are currently stranded on both sides of the border.

The Afghan trade commissioner in Peshawar, Mr. Mervais Yousafzai, pointed out that the losses run up to a billion dollars for Afghanistan. And at the same time, the people of Pakistan also suffer because of the border closure.

He pointed out that the closure of the border (entry and exit points) was against all international laws, against APTTA and against (the rules of the) World Trade Organization (WTO) and South Asian Association for Regional Cooperation (SAARC). (www.thenews.com.pk, 28.01.2017 and tribune.com.pk, 28.02.2017) ■

Pakistan business seeks CPEC benefits

PAKISTANI business community has urged the government to announce a 'domestic business plan' along the route of the China Pakistan Economic Corridor (CPEC) to take care of local industry so that domestic investors can reap maximum benefit of this mega project.

Pakistan Readymade Garments Manufacturers & Exporters Association (PRGMEA) Central Chairman Mr. Ijaz Khokhar suggested to set up a CPEC Business Committee or a CPEC Business Wing to update the local industry about the nature of China's planned industrial units in the country, warning of its adverse effect on local industry.

He said that domestic industries are already at risk of being wiped out due to dumping of cheap Chinese products. "We appreciate the government efforts for CPEC which has

opened opportunities for industrial cooperation between the two friendly countries. However, it is our opinion that CPEC committee or CPEC Business Wing should be established to safeguard the existing local industry as well as international investors."

Mr. Ijaz requested the government to also provide incentives and tax relaxations for every industrial unit across the country as it has declared for Chinese investors in CPEC, to provide a level-playing field. He complained that presently China has created non-tariff barriers for Pakistani investors through a strict visa policy.

Lahore Chamber of Commerce and Industry (LCCI)'s Former Vice President Mr. Kashif Anwar said that CPEC is going to help Pakistan by creating millions of new jobs. However, Chinese exporters are enjoying zero duties on 35 per cent of total prod-

uct lines. In comparison, China has offered to immediately slash duties to 70 per cent of product lines. Both sides are negotiating the free-trade agreement afresh after Pakistani industries complained about the 2006 agreement that was highly in favour of China.

Former President of the Federation of Pakistan Chambers of Commerce and Industry (FPCCI) Mr. Rauf Alam was concerned about the protection of the local industry, which would have to compete Chinese products to be directly supplied to Pakistani market or to be produced in industrial units at Special Economic Zones (SEZs) enjoying better facilities and incentives including tax holiday against the existing ones facing various problems, mainly the high cost of doing business. "Existing industries be placed at par with those at SEZs", he asserted. (*nation.com.pk*, 07.01.2017) ■

SARSO finalizes three product standards

THE eight member countries of the South Asian Association for Regional Cooperation (SAARC) have got three common standards for three different products.

The countries will now use these common standards instead of different national standards. This will help reduce trade costs.

Of the three, two are product standards: Biscuits-Specification (SARS 0006) and Refined Sugar-Specification (SARS 0007). The third one is Code of Hygienic Practice for Dairy Industry (SARS 0008).

South Asian Regional Standards Organization (SARSO) finalised the standards in its fifth governing body meeting held in Dhaka from 28 February to 1 March 2017.



"Though we have formulated and proposed 20 SAARC standards, only three got finalized now," said Dr. Syed Humayun Kabir, the Director General of SARSO.

"The national standardization bodies of the respective countries will be responsible for adaptation and implementation of the standards," he said.

"When there is a difference between standard and regulation, generally regulation prevails as it is a legal binding for any country," he added. "Thus, if any SAARC standard doesn't match with a regulation of a member country, it is most likely that the country may discard the SAARC standard."

"For most of the products on which South Asian countries are trading among themselves, tariffs have either gone or they are low," Mr. Bipul Chatterjee, Executive Director of Jaipur-based CUTS International, said. "On the other hand, the standards, including asymmetry of information related to the application of standards, are hindering regional trade from achieving its potential, he said." (*www.thefinancialexpress-bd.com*, 05.03.2017) ■



‘Bangladesh can import power from Nepal through India’

BANGLADESH’S State Minister for Power and Energy Mr. Nasrul Hamid has informed that his country has received India’s consent to import power from Nepal using Indian territory.

Mr. Hamid told reporters that

Bangladesh will sign an investment deal with Nepal to set up a power plant.

He also said that a similar deal will be signed with Bhutan as Bangladesh has been planning to import about 10,000 MW of

electricity from the neighbouring nations. Mr. Nasrul added that Bangladesh has also taken up a massive plan to generate 10 per cent of total electricity from renewable energy sources. (*en.prothom-alo.com/*, 21.01.2017) ■

India, Nepal to sign pact on transit cargo movement

A Memorandum of Intent (MoI) on India-Nepal Electronic Cargo Tracking System (ECTS) pilot run will soon be signed by India and Nepal to facilitate movement of traffic-in-transit belonging to Nepal, from the port of arrival in India to Nepal. “The pilot aims to demonstrate the benefits, especially in terms of reduced costs, of the ECTS system,” India’s Finance Ministry said in a statement on 30 March 2017.

Currently clearance is done through physical inspection which is time consuming as well as costly. The MoI will include the use of ECTS to follow the cargo (containers and full-body trucks) as it moves from the port of arrival through India, to the Nepali border.

The ECTS uses technology such as satellite positioning systems, cellular communications, radio frequency (RF) identifica-

tion, web-based software and others, to ensure the security of the cargo and avoid any interference in transit.

The pilot project is supported by the Asian Development Bank (ADB). ECTS pilot runs have already been done along the Kolkata-Jaigaon-Phuentsholing route between India and Bhutan, and for inland transshipments in India. (*www.business-standard.com*, 30.03.2017) ■

Pakistan's agriculture needs to be intensified sustainably

Rabia Manzoor, Imran Saqib Khalid and Atif Yaseen

The agriculture sector in Pakistan contributes 24 per cent of the Gross Domestic Product (GDP) and employs around 48.5 per cent of the labour force.¹ About 61 per cent of Pakistanis live in rural areas, where their livelihood depends on the agriculture sector, directly or indirectly. Unfortunately, the agriculture sector faces many threats and challenges despite its significant contribution to employment generation, export earnings, economic development and food security.

The performance of the overall agriculture sector remained subdued in Fiscal Year (FY) 2016 witnessing a 0.19 per cent growth against the 2.53 per cent of the previous year. The growth of the main crops, such as cotton, rice and maize, declined by 6.25 per cent from the previous year.¹ The main reasons attributed include ancient farming techniques, lack of technological innovation, problems with quality, quantity and timeliness of input supply, expensive pesticides and fertilizers, depletion of water resources, poor irrigation systems, soil degradation, lack of agriculture financing, limited investment in construction and maintenance of infrastructure and lack of sustainable intensification practices.

Win-win farming

The decline in agriculture production is a serious issue, which is exacerbated by a growing population. That is why sustainable intensification of agriculture practices are necessary to meet the current and future societal needs, job creation, export earnings, economic development and food security. Agriculture Intensification is defined

as an *"increase in agriculture production per unit of inputs (which may be labour, land, time, fertilizer, seed, feed or cash)² and "yields are increased without adverse environmental impact and without the cultivation of more land"³*. The practice aims to increase agriculture output from the same available land area, while protecting the environment. Literature shows that intensification has a significant effect on farmers' livelihoods and the environment. It involves increasing crop yield, better management practices of cultivated land, increase in farm incomes and economic development.

The following constraints impede sustainable agriculture intensification in Pakistan:

Soil degradation

One of the key factors contributing to low land productivity is soil impoverishment caused by continuous cropping without addition of adequate mineral fertilizers. Moreover, negative soil nutrient balances throughout the cropping history have resulted in the deterioration of fertility levels. Sustained, high yield production is assured once these negative balances are addressed. Pakistani soil is deficient in nitrogen (100 per cent), phosphorus (90 per cent), zinc (70 per cent) and boron (55 per cent).⁴

Irrigation constraints

In Pakistan, farmers face unreliable and inadequate canal water supplies, not to mention inequitable water distribution. In 2015-16, Kharif crops received 65.5 millions acre feet (MAF) of irrigation demonstrating a decline of 5.5 per cent from 2014 and 2.4 per

cent less than the routine supply of 67.1 MAF. The 2015-16 rabi season saw water accessibility remain at 32.9 MAF, which is 0.6 per cent less than in the previous year. This was 9.6 per cent less than the routine accessibility of 36.4 MAF. Similarly, poor-quality of groundwater makes irrigation problematic for farmers. Pakistan's water use productivity of wheat is 0.76 kg/m³, which is 24 per cent lower than the world average of 1.0 kg/m³. Water use effectiveness of rice is 0.45 kg/m³, or 55 per cent less than the Asian average of 1.0 kg/m³. Water use productivity for yields is 0.13 kg/m³, which is low compared with India's 0.39 kg/m³ and 0.82 kg/m³ of China.⁵

Limited inputs

The limited supply of modern inputs like fertilizers, pesticides, high yielding seeds and automated machinery are the major hurdles to agriculture in Pakistan. Suppliers create artificial scarcity to increase prices. Moreover, farmers are not fully aware about the importance of balanced and timely application of fertilizer, high yielding seeds and pesticides. Pakistan's soil is found to be deficient in necessary nutrients such as nitrogen, phosphorus, zinc, sulphur and boron. The inputs and methods to supply the lacking nutrients is not available, which severely affects agriculture productivity.

Inadequate infrastructure

Rural infrastructure like roads, transport, electricity, education, sanitation and health facilities etc. are inadequate to meet the requirement of sustainable agriculture growth. In Pakistan, lack of physical infrastructure manifests as

limited access to inputs and inadequate market for the outputs affecting agriculture productivity. The roads are in wretched condition and many villages have no metalled roads at all. Electricity is available for only three-fourths of the rural population. According to the National Electric Power Regulatory Authority (NEPRA)'s State of Industry Report 2016, more than 32,000 villages in the country continue to remain without access to electricity. All these increase the cost of doing business and resulting in low agriculture productivity.

Lack of agriculture financing

Pakistani farmers are poor and agriculture credit facilities are not easily available. Inadequate loan, high interest rate and untimely availability impact crop productivity adversely. It has been estimated that 50.8 per cent farmers borrow from landlords at high interest rates. Small farmers who have less than two hectares of land generally do not get credit facilities preventing them from using quality inputs. The result is that their crop yields remain low. Limited availability of finance obviously results in low agriculture productivity.

Traditional farming techniques

Even though modern agriculture techniques are increasingly being used in Pakistan, but in most areas, old practices are still the mainstay. Ancient farming techniques cannot compete with their modern variants in bringing production levels to the international standard. The shift of agribusiness to modern cultivating systems depends on satisfactory accessibility of resources such as guaranteed seeds, adjusted utilization of manures, accessibility of agriculture credit, effective water management practices, innovative climate resilient strategies and access to markets. Pakistan is far behind in these as compared to developed countries.

Ineffective agricultural knowledge and training

Inadequate training given to farmers does not give farmers the required

knowledge needed to increase agriculture productivity. Several training and capacity building programs have been organized by government, private sector and civil society organizations to enhance farmers' capacity. More needs to be done to alleviate this issue. Farmers in many areas of Pakistan do not get any guidance about modern techniques (such as laser land levelling, zero tillage, bed planting, sprinkler and trickle irrigation methods), innovative practices (such as irrigation, waterlogging and salinity management practices) and advanced strategies (managing water, soils and crops properly for enhanced land productivity). Apart from weaknesses in policy implementation, improper approaches in the application of modern inputs, chemical inputs and ways to maximize benefits are significant constraints to agriculture intensification.

Lack of coordination

Lack of coordination between agriculture researchers and farmers is another hurdle to achieve sustainable agriculture intensification. Information flow among the relevant stakeholders is constrained by poor coordination among the different wings of the agriculture department, irrigation department, power department, research extension programmes, farming communities and policy makers. Coordination among these stakeholders can be improved.

Natural calamities

The 2017 Global Climate Risk Index has ranked Pakistan as the 11th most climate change affected country. There were floods in 2010, 2011 and 2012, droughts between 1998-2002 and an earthquake in 2005 affecting the whole country, not just agriculture. Storms and other natural disasters triggered by climate change have adversely affected agriculture productivity in Pakistan. The country is at the top among developing countries that risk losses in agriculture.⁶ Crop productivity declines by about 20 per cent in Pakistan because of climatic circumstances and extreme weather

events. Overall production exhibits a declining trend attributed to changing weather patterns and frequent occurrences of extreme weather events.

Key with government

Agriculture intensification efforts suffer in Pakistan due to factors such as poor irrigation, inadequate water management practices, soil degradation, limited availability of inputs, low quality seed production, inadequate infrastructure, lack of agriculture financing, ancient farming techniques, natural calamities and ineffective agricultural knowledge and farmer trainings. These shortcomings will be exacerbated as climate change takes hold in the coming decades. It is therefore imperative that the Government of Pakistan puts in place plans and procedures to adequately address these areas. A broad-based governmental initiative to prioritize sustainable agriculture intensification is the need of the day. ■

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Notes

- ¹ Pakistan Bureau of Statistics. 2017. *Agriculture Statistics*. Islamabad: Government of Pakistan.
- ² FAO. 2004. *The Ethics of Sustainable Agricultural Intensification*. FAO Ethics Series No 3. Rome: Food and Agriculture Organization.
- ³ The Royal Society. 2009. *Reaping the benefits: Science and the sustainable intensification of global agriculture*. London: The Royal Society.
- ⁴ Khakheli, M. A. 2017. "Sustainable Agriculture and Fertilizer Practices". *Business Recorder*, 27 July.
- ⁵ a. Qureshi, A. S. 2013. "Efficiency in Irrigation Water Use". *DAWN*, 2 September.
b. Aslam, M. 2016. "Agricultural Products Current Scenarios, Constraints and Future Prospects in Pakistan". *Sarhad Journal of Agriculture*, 32(4):289-303. doi:w10.17582/journal.sja/2016.32.4.289.303
- ⁶ FAO. 2015. *The Impact of Natural Hazards and Disasters on Agriculture and Food Security and Nutrition*. Rome: Food and Agriculture Organization

Whether it is public health, managing disasters and other resources like water or practising agriculture, identifying inherent traditional knowledge and utilizing it has been an ongoing exercise in Sri Lanka. In several instances, utilizing traditional knowledge has led to enhanced welfare and sustainable development for the country. Agriculture has not been untouched from this phenomenon

where increasingly the farmers, consumers as well as the policymakers realize the negative externalities—health hazards and soil degradation among others—in using chemical fertilizers. Consumers, mostly the middle classes and above, are willing to pay a higher price, an incentive for the farmers, for organic produce.

However the trade-offs are daunting as organic agriculture may not ac-

tually meet the demand for cheap food grain for the existing population. Sustainable intensification of agriculture (SIA), which at the most fundamental level means expanding organic or sustainable agricultural practices without sacrificing significantly the productivity, may be key to sustainable development in Sri Lanka. Given that, like the rest of South Asia, Sri Lanka does have a rich history of organic agriculture,

Sri Lanka goes back to lead by example

Chatura Rodrigo



combining traditional practices with current agricultural technologies may well serve as a model of sustainable development not just for Sri Lanka but for the entire region.

Long history

Sri Lanka has a long history of sustainable agriculture. Many decades back, its agriculture was based on organic fertilizer. However, productivity of organic farming wasn't enough to meet the rapidly expanding demand. Therefore, an attempt was made to introduce new high yielding rice varieties. But, new improved varieties were not responsive to organic fertilizer thus leading the way for chemical fertilizer to be introduced, making agriculture chemical intensive.

Fertilizer subsidies were introduced to incentivize use of chemical fertilizers. Machinery and innovative cultivation methods were also introduced. This was the start of the "Green Revolution" of Sri Lanka. The subsidy absorbed a significant portion of the national budget, and biological diversity and environmental sustainability in farming ecosystems became the casualties.

The recent rethinking on "Green Economy" and acceptance of the Sustainable Development Goals (SDGs) by the government of Sri Lanka have led the country to start emphasizing more on the Sustainable Intensification of Agriculture (SIA).¹ This new thinking was further motivated by an expanding middle class of the country whose demand for organic food has been growing.

This led to the Sri Lankan government launching its biggest movement on organic produce, initially aiming at promoting organic rice. The policy directive is an effort of the Strategic Enterprise Management Authority (SEMA) and it is being implemented based on the consultation with many related experts. The central discussion of this article is based on the organic rice production ecosystem and its value chain.

Higher incomes, greater yields and reduced production costs that support

livelihood development, constitute tangible benefits for farmers. Organic farming is capable of giving farmers' produce a premium price.² Organic agriculture, for example organic production of traditional paddy varieties, is not considered high yielding. However, there are ways and means that farmers have developed over time to increase their per acre harvest. There are research that have now come up with new improved varieties, which carry most of the medicinal qualities of traditional rice. Scientists have also come up with new organic fertilizers that are more responsive to climatic conditions and the available paddy varieties of the country.

In organic agriculture, environmental pressures are minimized by developing methods to produce more food from existing land as land, water and energy are already in short supply. Organic paddy farming is primarily focused on marginalized lands. This is to ensure that harvests are not contaminated by chemicals—a major issue when using existing chemical oriented lands.

Organic paddy farming can be done through different cultivating practices. Those like the System of Rice Intensification (SRI) method use little water. However, more research is essential in order to make it part of export value chains. At the experimental level, these methods have proven to be a success.

SIA is related to minimized environmental pressures, policies for efficient resource use, biodiversity and ecosystem services, reduction of rural poverty and healthier diets. As the attributes that define SIA can be found

Although organic paddy farming uses resources efficiently, less than 10 per cent farmers are in the commercial value chains.

in organic agriculture, promoting latter can help achieve the objectives of SIA.

Socio-economic conditions can be positively transformed through SIA, including enhancing farmers' resilience to climate change, empowering producer organizations and leveraging strong market linkages. Organic agriculture is closely associated with traditional paddy varieties, which have proven capabilities in climate change adaptation. Organic farming has a long history, therefore, it consists of traditional knowledge passed on from generation to generation. It helps them to be on value chains that carry higher prices and, most of the time, are export oriented.

Resource-use efficiency

Organic paddy farming uses resources efficiently, but less than 10 per cent of Sri Lankan farmers are integrated to commercial value chains. Proper policies can push poor and vulnerable farmers into the organic paddy value chain. Since organic agriculture is capable of attracting higher prices, it is possible to increase the incomes of farmers. However, in order to bring down production costs, traditional knowledge and new innovation must go hand in hand.

The two biggest positives of organic paddy farming are the harmony it holds with the environment and its ability to produce healthy food. Organic paddy farming does not pollute water as there are no chemicals to be washed off. Therefore, downstream water is not polluted thus eliminating major negative externalities and burdens such as compensation payment and abatement costs.

The organic matter put into the soil is capable of improving soil fertility and regenerating soil properties which makes the soil less erodible, making land degradation less of an issue. Organic matter also improves the macro and micro fauna and flora diversity in organic farming systems. This will encourage biological control of most pest and diseases that are unique to paddy cultivations. Since farmers

do not have to invest in chemical or biological pesticides, production costs also decrease. With increased biological diversity, fertile soil and a greenish plantation, organic paddy farming ecosystems is likely to provide enough esthetic appeals for people to go and “connect with nature”.

Prices of organic produce are normally double the chemical based counterpart. Yet, consumers are willing to pay more to do away with the health costs arising from consuming chemical based produce.³ Since the issue is affordability, policies should be directed towards bringing down production costs so that farm gate prices are reduced. At the same time, investments to bring about changes in attitude will increase the consumers’ willingness to pay.

In spite of research hailing the benefits of organic paddy farming, its adoption rate in Sri Lanka is still not very significant. For a farmer, adopting organic agriculture is a major decision affecting their income.⁴ Therefore, he will always consider the opportunity cost of supply: “How much does

a farmer have to forgo/invest in order to be at the same production/profit levels of a chemical based farmer”.

This writer’s own research work shows that the opportunity cost of supply in organic paddy farming comes from (i) organic fertilizer (ii) traditional paddy seeds (iii) labour and (iv) land.⁵ On average, close to a ton of organic fertilizer is required to cultivate an acre of organic paddy. This is a major cost that most farmers are not able to afford. This leads most of the farmers to either use less fertilizer or cultivate less acreage. Either way, the total production goes down.

Either bring down the price of traditional paddy varieties or come up with a new variety that is better in quality and responsive to organic fertilizers.

In terms of chemical based farming, on average, a farmer needs to put between 180-250 kg of mixed fertilizer per acre. Earlier, this used to be heavily subsidized. Today, the subsidy program has been converted into a coupon system. To encourage more farmers to adopt organic fertilizers, the policy recommendation is to develop a fertilizer that is at par with the inorganic fertilizer. Although field trials are still undergoing, a type of fertilizer has been developed, 200-300kg of which is sufficient for an acre. Now the challenge is to develop the value chain for farmers to be able to afford it and also have easy access to this fertilizer.

In terms of seeds too, availability of traditional varieties of paddy is also limited as the farmers that cultivate these varieties do not possess the capability to produce them on a large scale. In addition, the price of traditional paddy is higher, LKR 50-90 per kg. This price is higher than for new improved varieties. Here, the policy recommendation is to either bring down the price of traditional paddy



varieties or come up with a new improved variety that is better in quality and responsive to organic fertilizer. One way of bringing the price down is by promoting farmers' organizations to become seed producers.

Sri Lanka is yet to develop a strategy to encourage farmers' organizations to become traditional seed producers. However, new improved varieties that are responsive to organic fertilizer are being tested. Mechanization is a good solution to address the issues around labour shortages. However, the unique characteristic of organic farming, especially with traditional paddy varieties, is that it sometimes limits the use of modern machinery. Therefore, here, the policy recommendation is to develop machinery, sometimes vary basic machinery to plough the land or perform weeding that is suitable for organic paddy farming. Interestingly, farmers have come forward with some innovative simple tools that can be further developed. However, responsible government institutions have been slow in taking these up.

Chemically fertilized lands will take three to five years to become suitable for organic paddy farming. While these lands are getting ready, it is possible to use marginalized land to promote organic agriculture. The recent budgetary announcement of the Government of Sri Lanka had made recommendations to release some of the marginalized land owned by the Government to organic agriculture, which is an ideal step.⁶

Willingness to pay

Consumer willingness to pay for organic produce is an important factor that determines the success of SIA, especially in Sri Lanka. Improving the awareness level is important for SIA to take root, which is happening on a large scale with the initiative of the Department of Agriculture and the private sector. However that alone is not enough. There are some economic considerations as well. The price of organic rice should be aligned with the consumer's willingness to pay

Sri Lanka provides a good example of how SIA can be adopted through policy amendments and formulations.

(WTP) for the product. At the moment, organic rice price varies between LKR 120-350 per kilogram, depending on the seller and the traditional paddy variety. On the other hand consumer WTP ranges between LKR 90-120 per kilogram. This mismatch must be resolved.

Organic rice available at low prices has no certification at all and higher income groups only consume products with certifications. Therefore, the policy recommendation is to establish affordable and accessible certification system for the farmers for quality assurance. International certifications are costly, which aggravates the cost problem for both the farmers and consumers. This makes it necessary for Sri Lanka to have customized certification systems that can be jointly implemented by Department of Agriculture and Sri Lanka Standards Institute (SLSI).

Sri Lanka is currently working to come up with a certification system unique to the country's organic agricultural produce. A proper certification system will change the market price structure, but it will also change the WTP as regards the consumer.⁷

Sri Lanka provides a good example of how adoption of SIA can be tackled through policy amendments and policy formulations. From abolition of the chemical fertilizer subsidy⁸ to promotion of a National Programs on Toxin Free Produce, many policies are defining how Sri Lanka will look in the next 10 years. The challenge is to make these policies sustainable and not susceptible to political changes. Once the political commitment is in place and all economic considerations are included in the policy dialogue, Sri Lanka can surely form a better frame-

work that can be readily adopted by other South Asian countries. This is the right time to fall back on what we used to do. ■

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Notes

- ¹ Rodrigo, Chatura. 2015. "Essential Factors in Bringing Back Organic Rice Farming: A Case Study from Nilwala River Basin". *The Island*, May 20. Accessed 20 June 2017. http://www.island.lk/index.php?page_cat=article-details&page=article-details&code_title=125054
- ² Rodrigo, Chatura. 2017. "Why Do Agricultural Value Chains Fail: Part (1): Transaction Cost Explanation". *Daily Financial Times*, October 27. Accessed 20 June 2017. <http://www.ft.lk/article/576233/Why-do-agricultural-value-chains-fail?-A-transaction-cost-explanation>
- ³ Rodrigo, Chatura. 2017. "Top Five Issues in Agriculture". *Daily Financial Times*, January 30 Accessed 20 June 2017. <http://www.ft.lk/article/594621/Top-five-issues-in-agriculture>
- ⁴ Rodrigo, Chatura. 2016. "Are we ready for organic paddy farming; what determines organic fertilizer uptake and profits". *Daily Financial Times*, May 17 Accessed 20 June 2017. <http://editorial.ft.lk/2016/05/17/are-we-ready-for-organic-paddy-farming-what-determines-organic-fertiliser-uptake-and-profits/>
- ⁵ Rodrigo, Chatura. 2016. "Where does organic farming heading: An economic explanation". *Daily Financial Times*, August 3. Accessed 20 June 2017. <http://www.ft.lk/article/558920/Where-is-organic-farming-heading--An-economic-explanation>
- ⁶ Rodrigo, Chatura. 2017. "Connecting People To Nature: Importance of Knowing Ecosystem Goods and Services (EGSs)". *Daily Financial Times*, June 5. Accessed 22 June 2017. <http://www.ft.lk/article/620023/Connecting-people-to-nature--Importance-of-knowing-Ecosystem-Goods-and-Services--EGSs->
- ⁷ Rodrigo, Chatura. 2017. "Why do agricultural value chain fails: part VI: Incentives for certifications". *Daily Financial Times*, June 30. Accessed 22 June 2017. <http://www.ft.lk/article/625171/Why-do-agricultural-value-chains-fail?-Part-VI--Incentives-for-certification>
- ⁸ Rodrigo, Chatura. 2015. "Fertilizer Subsidy, Research Findings for Policy Makers". *The Island*, June 5. Accessed 22 June 2017. http://www.island.lk/index.php?page_cat=article-details&page=article-details&code_title=117121

More crop per drop

Water-saving technology in rice production would be an efficient method to keep the South Asian underground water table at a safe level.

Veena Vidyadharan

Growing population, increasing urbanization and shrinking renewable freshwater resources have become crucial concerns for South Asia in its combat against food insecurity. “More crop per drop” is the new mantra to achieve sustainable food production in the region.

Climate change, characterized mainly by increasing mean temperature and unfavourable weather patterns with recurring spells of droughts and floods, has made those concerns even more serious. The primarily agrarian economy of South Asian countries is highly dependent on monsoons, which have become erratic in the last two decades. This

has increased food and water security woes in the region. Around 90 per cent of freshwater in the region is consumed by the agriculture sector with around 40 per cent of total arable area under irrigation.¹ Sadly, irrigation water efficiency is quite poor in South Asia when compared with other developing regions like Central and South-East Asia.² With countries like Bhutan, Maldives and Nepal respectively having just 13.79, 26.33 and 28.75 per cent of their total land area as agricultural land, the pressure to produce the maximum yield per unit of arable land is a matter of paramount concern (Table).

Water stress grows

Except for Maldives, where the major crop is coconut, all other South Asian countries primarily have cereal-based cropping systems, rice and wheat being major staples. Apart from Bangladesh, Bhutan and Sri Lanka, the cereal productivity in the remaining region is below 3,000 kg/ha. Higher productivity is mainly dependent on higher seed replacement rate, better and improved varieties, continuous irrigation and sustainable soil management practices. Of these, irrigation is a critical input, which decides the productivity of crops. For example, in Bangladesh, rice production over the last decade increased considerably due to irrigated Boro rice, which accounts for 55 per cent of the total rice production in the country. Similarly, irrigation was the significant component, along with promotion and adoption of high yielding varieties of seeds and chemical fertilizers, which took India's cereal production to higher levels after the adoption of the green revolution.

South Asia is expected to experience a rise in temperature, floods and droughts as per the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) published in 2014. Given the agrarian economy of the region, these climate



Table

Agricultural land and water availability in South Asia

Country	Agricultural land (% of land area) 2014	Cereal yield (kg per hectare) 2014	Renewable internal freshwater resources (billion cubic metres) 2014	Renewable groundwater (billion cubic metres) 2014	Annual freshwater withdrawals, agriculture (% of total freshwater withdrawal) 2017
Afghanistan	58.07	2017.5	47.15	10.65	98.62
Bangladesh	69.90	4618.4	105	21.12	87.82
Bhutan	13.79	3130	78	8.1	94.08
India	60.41	2984.1	1446	432	90.41
Maldives	26.33	2405.1	0.03	0.03	0
Nepal	28.75	2747.9	198.2	20	98.14
Pakistan	47.03	2750.3	55	55	93.95
Sri Lanka	43.70	3801.9	52.8	7.8	87.34

Source: World Development Indicators (2014, 2017)³, Aqua stat (2014)⁴

vagaries will have implications on water resources and food production systems. Thus, sustainable water management is the key to ensure food security of the mounting population.

Blame for the stress on both surface and ground water resources in the region must go to the dominance of water guzzling rice-wheat cropping system. Selection of the cultivated crops should be based on agro climatic conditions prevailing in the location, but, quite often, farmer's expertise, availability of labour, government incentives and market support play a decisive role in this. Cotton and wheat used to be the traditional crops in Punjab and Sindh Provinces of Pakistan. In the recent past, however, more and more farmers have shifted to sugarcane because of government induced subsidies, which ultimately led to the advent of sugar mills supported by a strong sugar lobby. Similarly, government procurement of rice and wheat in India through the minimum support price (MSP) scheme has given an assured market for these crops. Hence, they are grown widely even in the semiarid regions of India.⁵

Furthermore, the cereal based cropping systems of the Indo-Gangetic Plains was supported by well-developed canal irrigation systems in the past. Over the years, due to negligence and poor maintenance of these canals, farmers have switched to ground water resources. Farmers in Punjab

Province, in both India and Pakistan, resort to over extraction of ground water even when there is a diversified network of canals. Surface irrigation through big irrigation projects has failed mostly due to siltation and lack of regular repair and maintenance of the irrigation infrastructure. Poor cost recovery mechanisms, as a result of inactive Water User Associations (WUAs), and diversion of water from the head end of the canal for both agricultural and non-agricultural uses have also contributed to the dearth of surface irrigation systems. Additionally, the latter practice has deprived irrigation water for tail-end farmers.⁶

In India's Punjab, groundwater exploitation and surface water underuse is mainly because of attractive subsidies for acquiring submersible pumps and free electricity for water extraction. Since over-exploitation leads to receding groundwater levels, Punjab farmers have started using submersible pumps with higher capacity to draw water from deeper aquifers. In Pakistan, farmers pay for

extending cables from the main power lines to the tube well, whereas in India the State Electricity Board bears this cost. In Indian states where electricity is not subsidised, farmers resort to diesel pump-sets. On the other side, given the level of awareness about saving water in Bangladesh, fossil fuel subsidies have benefited smallholder farmers without over-exploiting water resources. This is quite unlike the energy subsidies, in the form of cheap electricity, in the drier parts of India.⁷

Water-saving technology in rice production would be an efficient method to keep the South Asian underground water table at a safe level. Instead of flood irrigation, alternate wet and dry (AWD) methods of irrigation can be used. In addition, surface water should be reserved in ponds and small rivers in the rainy season and mainly used for Aman rice cultivation, especially during the flowering stage. Bangladesh Rice Research Institute (BRRI) has developed a rain-water harvest technology for rain-fed Aman cultivation during the flowering stage to mitigate drought.⁸ This kind of conjunctive use of water is also recommended for Sri Lanka's dry zone, which comprises about 70 per cent of its land. This would improve the livelihoods of those dependent on agriculture.⁹

Agricultural practices like System of Rice Intensification (SRI), double transplanting¹⁰, direct seeding of rice

Sustainable water management is the key to ensure food security of the mounting population.

and laser levelling make efficient use of irrigation water. Zero tilled wheat cropping, following the harvesting of rice, is also getting popular in parts of Bangladesh, India and Nepal. However, such practices have to be promoted widely by the state and civil society organisations for the farming communities to truly benefit from them. Any effort to improve water use efficiency would have implications in energy saving as well. Axial flow pumps, micro irrigation techniques and solar pump-sets are also energy efficient. Small, mobile diesel engines that are demountable and can be used for a range of applications, including powering of irrigation pumps, have increased food production and economic returns to farmers.¹¹ At the moment, these practices are localised among progressive farmers. They need to be scaled up to make them widespread. Awareness generation and capacity building of farmers is crucial to achieve this.

Policy implications

Small and marginal farmers of South Asia are vulnerable to the adverse effects of climate change. Most of them either face drought or floods almost

Water, energy and food nexus demand a comprehensive contingency plan with adequate policy support.

every year. Given the complexities of the water, energy and food nexus, it is important to develop a comprehensive contingency plan, with adequate policy support. The objective here is to build the resilience of the farmers.

There is a need to strengthen research on hardy, climate resilient nutritious crops like millets and pulses. Varieties catering to the need and taste of farmers will have to find a place in their cropping system. Proper value addition will create a demand for products from these crops, thus, enhancing their market value. Based on local demand and preferences, pulses and millets should also be included in the government's Public Distribution System procurement scheme. This may cause the water intensive cropping system to change for the better.

Revival of existing surface irrigation system will definitely cut down the dependency on ground water resources. Proper cost recovery mechanisms would lead to better maintenance of the canals. An innovative example can be taken from the irrigation project of Barind Multipurpose Development Authority (BMDA) at Godagari *upazila* of Rajshahi District in Bangladesh. Here the river water is reserved in a canal and the farmers access it using a prepaid card with a prepaid meter. After the specific period allocated to the farmer, the machine gets shut down automatically.¹² Water tariff on the basis of volume, rather than area based or crop based, and re-investing the proceeds in the operation and maintenance of the canal system, would improve the overall functioning of surface irrigation systems.

Better governance of surface water systems can also be envisaged through participatory irrigation management. Today, Water Users Associations are inactive in most places mostly due to faulty implementation.

Rational pricing of electricity for agricultural purposes, through metering, would check the exploitation of groundwater. In other words,



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a major shift in the outlook of government policies regarding ground water management is necessary. The Sub Soil Conservation Act of 2009, in Punjab, India, is a commendable step as it regulates paddy transplantation beyond a notified date, which comes in June. It needs to be seen if such regulation is necessary for ground water management for Boro rice cultivation as it is solely dependent on groundwater irrigation.

Water saving technological interventions like laser levelling, zero tillage, solar pump sets and axial flow pumps and micro irrigation require capital investments. Hence, capital subsidies on related machineries would make them accessible to small and marginal farmers. Moreover, these machineries can also be made available to farmers through farmer cooperatives/producer companies. Custom hiring is another option, which is widely adopted in many parts of South Asia. Agro-service centres at the local level should take care of service delivery and maintenance and repair of the equipment.

Capacity building of farmers on water saving technologies and practices is essential to improve water use efficiency. Strengthening of extension services by government and civil society organizations should go hand in hand with awareness generation. Progressive farmers can act as change agents in this respect. Informal social networks enabling farmer-to-farmer learning are found to be more effective than trainings and demonstrations by extension departments. Incentives for adopting water conservation practices and savings in electricity bills for irrigation would also scale out the adaptability of these practices.

Conjunctive use of water needs to be adopted wherever possible. Water harvesting structures and storage tanks assure lifesaving irrigation in drought affected areas. Watershed management would reduce runoff and induce in-situ moisture conservation and, hence, should be an integral component of planning development work at local government levels. Several

parts of India and Sri Lanka receive short spells of heavy rainfall leading to runoff loss. A vast area in Bangladesh and India, however, is subjected to drought and annual floods necessitating watershed management.

Clubbing irrigation subsidies with water saving practices would ensure efficient use of the resource. For instance, in Rajasthan subsidies for solar-powered irrigation is clubbed with micro irrigation. Such bundling of policies ensure water conservation as well as water use efficiency.

Owing to the variation in availability, demand and possibility of recharge across aquifers, it is useful to have aquifer-level planning. This should not be limited to only at national level planning. A regional strategy is needed to enable sustainable use of groundwater from transboundary aquifers.

Three-pillar strategy

Sustainable use of water resources is an integral part of sustainable intensification of agriculture. Since water use efficiency is closely linked with crop management and energy policy in the South Asian context, a holistic approach needs to be followed while developing a regional strategy for sustainable intensification of agriculture. Similar agro-climatic regions and food production systems existing in immediate border areas would enable cross-border learning and adoption of good management practices and policy initiatives. Joint research and development for crop management strategies, participatory approach for designing irrigation projects and a more inclusive policy making are the three pillars which will determine

Clubbing irrigation subsidies with water saving practices would ensure efficient use of the resource.

sustainable water use in South Asia in future. ■

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Notes

- Figures from FAO Stat <http://www.fao.org/faostat/en/>
- ADB. 2016. "Innovations to Meet Future Needs for Water, Energy and Food". Thematic Paper. Second Asian Irrigation Forum 20-22 January 2016, Manila.
- Figures from World Development Indicators. <https://data.worldbank.org/data-catalog/world-development-indicators>
- Figures from FAO AQUASTAT database. <http://www.fao.org/nr/water/aquastat/data/>
- CUTS International. 2016. *Rethinking Perceptions: Agriculture, Water and Energy Scenario in South Asia*. Jaipur: CUTS International.
- Vidyadharan, V., R.K. Jha, A. Mishra, S. Bhattacharjee, P. Nath, and A.K. Swain, A.K. "Agricultural Production and the Water-Energy-Food Security Nexus in the Indus, Ganges and Brahmaputra Basins of South Asia." *Sustainable Development Conference*, Islamabad-December 2014 Anthology. Islamabad: Sang-e Meel Publications.
- Weert, Frank van, Jac van der Gun, and Josef Reckman. 2009. *Global Overview of Saline Groundwater Occurrence & Genesis*. Utrecht: International Groundwater Resources Assessment Centre (IGRAC).
- Biswas, J. K. 2014. "Growing Rice Under Stress Environment". *The Daily Star*, 15 March.
- IWMI. 2010. *Sri Lanka: Issues and Opportunities for Investment*. IWMI Water Issue Brief 7. Colombo, Sri Lanka: International Water Management Institute (IWMI). 4p. DOI: 10.5337/2010.220
- In double transplanting of rice, 4 kg of seed is sown in a 40 m² nursery area. Seedlings are transplanted when 21-25 days old@8-10 seedlings per hill in close spacing of 5-8 cm in a small area (400 m²). The second transplanting is done 30-35 days after the first transplanting using normal spacing at one seedling per hill in the main field
- Steele, P. E. 2011. *Agro-Mechanization & the Information Services Provided by FAOSTAT*. Rome: United Nations Food and Agriculture Organization.
- ibid.* Note 6.

To meet the growing demand for food, the average global food production will have to rise anywhere between 59 to 98 per cent or from the current 8.4 billion metric tons to nearly 13.5 billion metric tons by 2050.¹ This amount of production is impossible if sweeping changes are not undertaken in food and agricultural systems. There are three uncontrollable factors, climatic conditions, pressures on

natural resources and rising prices, the key uncertainties that pose special challenges to farmers everywhere.

In the next 35 years, 66 per cent—up from 54 per cent in 2014—of the global population is projected to reside in urban areas. Almost all the predicted extra two billion will be living in the developing countries.² This will bring changes in people's consumption patterns, doubling the

demand on animal protein and calories by 2050. Animal feed to produce meat is many times more resource intensive than food grains. This pressure on global food demand is also likely to get buttressed by the increasing trend of biofuel production.

About a quarter of South Asia's population suffers from hunger and malnutrition.³ Since 1990-92, the proportion of undernourished population

Sustainable intensification

A strategic framework for South Asian agriculture



Intensification refers primarily to improvement in resource efficiency with minimum impacts on the environment.

Hari Dahal

has been markedly reduced in Nepal followed by Maldives and Bangladesh, while India and Sri Lanka achieved a modest reduction, and Pakistan and Afghanistan are trailing behind.⁴ In food production, India and Pakistan are the only countries in the region with surplus food, but they are also the ones with the largest number of undernourished people.⁵

Green revolution technologies that brought decades of high yields and prosperity in South Asia and around the world has also had negative externalities regarding the environment, natural resource base and human health. Loss of agro-biodiversity, ground water depletion, land and soil degradation, pest resistance to pesticides, decline of crop productivity, increased emission of greenhouse gases (GHGs) and environmental pollution were the major ones.⁶

Furthermore, an increasing competition between agricultural and non-agricultural uses of land, water and natural resources is bound to make the food production system even more complex. Additionally, weather uncertainties and vulnerabilities induced by the climate change will affect agriculture and food security,

particularly for the poor and small-holder farmers.

South Asia, with a quarter of global population but hardly commanding three per cent global income, is already a home to the highest number of the world's poor and undernourished. Agriculture, therefore, needs to be changed into a more sustainable form from today's conventional and industrial model in order to meet the future demand for food even while conserving the natural resources and protecting our environment. So, the greatest challenge is to increase food production with fewer resources and with low impacts on the environment and natural resources. Sustainable intensification of agriculture seems to be the answer.

The Montpellier Panel Report (2013)⁷ defines sustainable intensification of agriculture (SIA) as a practical pathway towards the goal of producing more food with less impact on the environment, intensifying food production while ensuring the natural resource base on which agriculture depends is sustained, and indeed improved, for future generations.

In sustainable intensification, improving the efficiency of resource use

means more crops per kg of nutrient, more crops per drop of water and more crops per unit of energy and higher productivity per unit of labour used. Intensification refers primarily to improvement in resource efficiency with minimum impacts on the associated environment.

Key pathways

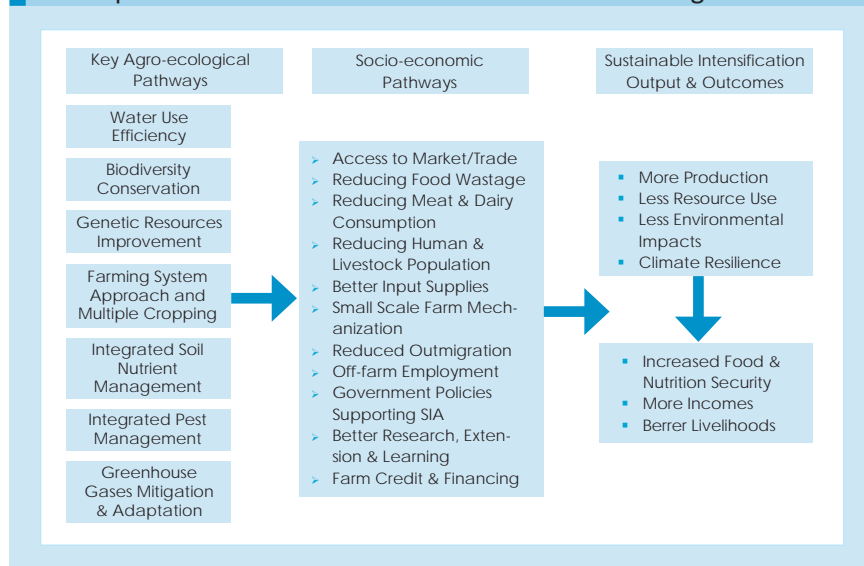
The concept is that the elements of the key agro ecological pathways have direct effects on sustainable intensification and those of the socioeconomic pathways have supportive but strong influence in producing the outcomes of sustainable agricultural intensification. Socioeconomic pathways include policy instruments to act as moderating variables to facilitate sustainable intensification. Their expected outputs are enhanced productivity with less and efficient use of resources, less environmental impacts and a climate resilient agricultural system. This whole process is eventually expected to contribute to increased agricultural production and food and nutrition security. The farmers benefit from greater incomes and better livelihoods.

Sustainability is thought to have three dimensions—environment conservation, economic growth, and social justice and equity. The three dimensions need to work complementing each other and in interdependence. In the depicted conceptual framework (Figure) the environmental dimension is represented by the key agro-ecological pathways and social and economic dimensions are reflected in socio-economic pathways.

Agricultural development policies in South Asian countries are mainly based on Green Revolution Technologies of the 1960s which are highly productive but are costly and can hardly be considered environment friendly and sustainable. At the same time, the lack of policy coherence undermines the effectiveness of policy instruments that support SIA. Therefore, South Asian governments need to create an enabling policy and regulatory environment to support and provide incentives for various stakeholders to

Figure

Conceptual framework: Sustainable intensification of agriculture



Source: Author's compilation from various sources

Table 1**Five key principles of sustainability**

- Improving efficiency in the use of resources
- Conserving, protecting and enhancing natural ecosystems
- Protecting and improving rural livelihoods and social well-being
- Enhancing the resilience of people, communities and ecosystems
- Promoting good governance of both natural and human systems.

Source: FAO (2014)⁸

invest in a SIA strategy. This would be the first entry point towards a paradigm shift from the conventional high input agriculture towards sustainable intensification.

Funding organizations such as the World Bank have also shifted their investment policy. The World Bank's investment policy on sustainable agricultural intensification is emphasized to be economically, environmentally and socially sound, efficient and based on sustainable institutions.

Food and Agriculture Organization (FAO) in its report, *Save and Grow* (2011)⁹, has put forth three key principles on which sustainable crop production intensification (SCPI) is based on. These are environmental principles, institutional principles and social principles that emphasize a more systemic approach to natural resource management. In its more recent publication, FAO has set out five key principles that balance the social, economic and environmental components of sustainability in agriculture and food system (Table 1).

The Sustainable Development Goals (SDGs) set by the United Nations replaced the Millennium Development Goals (MDGs) that

were adopted in 2000 to mainly tackle global poverty. The MDGs have made progress in several important areas but, still, issues of poverty, hunger and malnutrition remain. Furthermore, environmental degradation, resource depletion and climate change impacts have come up with high prominence. To address such issues, the UN Sustainable Development Summit in 2015 adopted The 2030 Agenda for Sustainable Development, a document outlining the 17 SDGs and 169 associated targets. The SDG agenda are important guidelines for post 2015 strategies of agricultural development, food security and sustainability.

Transformation of a conventional input-intensive agriculture into a more sustainable variety requires a number of fundamental shifts. These shifts pertain to outlooks, practices, capacity and inputs that the stakeholders have at their disposal, among other factors, including information available to them. The most important of them are listed below:

Crop diversity: For sustainability, crop diversification can be a key to meet the future food demands as it can best utilize the resources per unit of time and space as opposed to input-intensive monoculture.

Irrigation: Instead of resorting to wasteful surface irrigation, water resources must be used sustainably. Micro-irrigation technologies such as overhead, sprinkler and drip methods, rain water harvesting, use of

soil cover and practices to minimize surface evaporation, sustainable use of ground water, wetlands and strengthening water institutions and adoption of effective water policies can contribute in enhancing the South Asia's water security.

Soil conservation: Similarly, a good soil health can be brought about by balancing nutrient, organic matters, conserving moisture and controlling erosion. A balanced mix of nutrients in the soil from all sources—mineral fertilization, organic and biological—is the basis of agricultural sustainability. Not only in South Asia, nitrogen use efficiency in cereal production, was found to have decreased from 80 to 30 per cent between 1960 and 2000, globally.¹¹ Improving the efficiency of fertilizer use has become urgent rather than increasing fertilizer dose in South Asian agriculture. The fertilizer subsidy policies in most South Asian countries are not well targeted. They need to be reviewed to ensure that fertilizer inputs are properly used and farmers have enough incentives to invest in good agricultural practices.

Pest management: For sustainability, rampant pesticide use must be stopped and replaced by the integrated pest management which is an ecological approach designed not to eradicate pest population but to keep at levels that are not economically significant. Pesticides should be used only when it becomes absolutely necessary.

Seeds: Technologies for seeds and planting materials is another area awaiting a paradigm shift in South Asia. Choice of seeds should shift towards varieties with higher productivity, nutritive value, pests and disease resistance and resilience to climate change impacts. Adopting new technologies, however, should not be at the cost of agro-biodiversity conservation. Steps must be taken to slow down the rate of agro-biodiversity loss, their preservation in gene banks and payments for agro-biodiversity conservation services.¹² Policy is needed to pursue a balanced approach in extension of improved and hybrid

Table 2**National Water Security (NWS) Scores (1-100) for South Asia**

Country	2013	2016	NWS Index
Afghanistan	27.2	27.5	1
Bangladesh	25.0	35.3	1
Bhutan	39.3	48.5	2
India	29.5	33.1	1
Maldives	53.3	58.7	3
Nepal	28	37.3	2
Pakistan	28.8	32.7	1
Sri Lanka	44.3	51.4	2

Source: ADB (2016)¹⁰

seeds in areas of less biodiversity concentration in accordance with the Convention of Biological Diversity (CBD) and the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) of which South Asian countries are contracting parties.

GHG emission: Adoption of technologies and practices that contain GHG emissions and help adapt to climate change also play an important role in sustainable intensification of agriculture. Reducing fossil-fuel consumption, enhancing soil carbon sequestration, shifting in land use from annual crops to long rooted perennial crops, conservation tillage, improving fertilizer use efficiency, changes in livestock species with improvement in the digestibility of livestock feeds and effective manure management can help that happen.¹³

Waste and losses: Post-harvest losses, mainly in developing countries, must be reduced and food waste must be mitigated in food industries, supermarkets, hotels and restaurants and household consumption. Raising awareness and investing in technologies that save the losses from happening are required.

Dietary shift: A major dietary shift is needed for more affluent societies where meat and dairy consumption is

Table 3
The Global Hunger Index for select South Asian countries

Country	GHI Score			Global rank
	2000	2008	2016	
Afghanistan	52.4	39.2	34.8	111
Bangladesh	38.5	32.4	27.1	90
India	38.2	36	28.5	97
Nepal	36.8	29.2	21.9	72
Pakistan	37.8	35.1	33.4	107
Sri Lanka	27	24.4	25.5	84

Score >50 extremely alarming, 35-49.9 alarming, 20-34.9 serious, 10-19.9 moderate, and <9.9 low
Source: Author's compilation from various GHI reports¹⁴

very high, unsustainable and unhealthy. Dietary diversity is required to combat the macro and micronutrient deficiencies.¹⁵

Gender: South Asian agriculture is getting more feminized in recent years. In view of their role in agriculture, farm women need empowerment through affirmative action, enhanced access to resources and increased access to education and training.

Research: Studies show that where investment in agricultural research and extension is high, productivity growth rates have been higher and expansion rates of agricultural land often lower. It is found that a one per cent growth in agricultural value addition per capita can give a per capita gross domestic product (GDP) growth

rate of 2.13 per cent.¹⁶ Agricultural research in South Asia is more focused on cereals and traditional crops. It should diversify to emerging areas as well, such as biotechnology, precision farming, agro-robotics etc.

Extension and support: Adopting and practicing sustainable agriculture requires regular and adequate extension support and training in a constantly changing environment. Most countries in this region except Bhutan and Maldives have adopted pluralistic extension systems. But basic problems of lack of adequate number of extension workers and their limited capacities, low level of funding, weak linkage with research and lack of effective coordination among the stakeholders still persist.



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Studies show that where investment in agricultural research and extension is high, productivity growth rates have been higher and expansion rates of agricultural land often lower.

Market services: Although the share of agricultural export of South Asia in global market was less than ten per cent in 2014, it is expanding.¹⁷ Trade and market integration are becoming important even for poor farmers in lifting them out of poverty and increasing their incomes, yet most poor farmers are not integrated to marketing systems. In order to ease trade and encourage cross-border movement of goods, South Asian Nations have adopted the Agreement on South Asian Free Trade Area (SAFTA). Surprisingly, a host of non-tariff barriers are imposed, making SAFTA ineffective in intra-regional trade.¹⁸ Such measures hardly support sustainable agricultural development and food security in the region. The governments and private sector must work together in overcoming these problems.

Smallholder livelihood: In South Asia, India, a major food producing country, has 81 per cent farm land-holdings of less than 2 hectares, in Nepal 93 per cent and in Bangladesh and Pakistan smallholders account for 96 and 58 per cent respectively.¹⁹ In the name of modernization and commercialization, smallholder farmers' subsistence systems are entirely replaced by more risky and unsustainable high-output farming. Technologies suitable to their resources and conditions must be promoted to reduce these risks.

Self-sufficiency vs. security

Although enhancing production for food availability is essential, having national food self-sufficiency is not enough to ensure food security for the entire population, particularly to the poor and vulnerable. For Professor Amartya Sen²⁰, food insecurity is due to entitlement failures. He argues that food insecurity occurs not only from lack of food but from the inequalities, lack of access and failure of food distribution systems. The issue, therefore, is of access to food and the protection of entitlements, rather than achieving the national food self-sufficiency goal. Furthermore, food

Poor farmers are not integrated to trade and marketing systems which is important for increasing their income to lift them out of poverty.

self-sufficiency 'at any cost' or at the expense of natural resource and environmental degradation can hardly be emphasized in this age of globalization, when cheaper and better quality products can be easily imported. In this context, tackling food security requires major action on food self-reliance that may include raising food production and income, ensuring food access, entitlements and safety net provisions and strengthening regional cooperation on food security through market liberalization, trade and technical cooperation among the countries in the South Asia region. ■

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Notes

- ¹ Elferink, M. and F. Schierhorn. 2016. "Global Demand for Food in Rising. Can we meet it?". *Harvard Business Review*. April 7.
- ² United Nations, Department of Economic and Social Affairs, Population Division. 2014. *World Urbanization Prospects: The 2014 Revision, Highlights* (ST/ESA/SER.A/352).
- ³ Mukherji, I. N. 2015. *Food Security: The State of Agriculture in South Asia*. Accessed 15 May 2017. www.thesarcast.org.
- ⁴ FAO. 2015. *Towards a Food Secure Asia and the Pacific*. Bangkok: Food and Agriculture Organization Regional Office for Asia and Pacific.

- ⁵ Pant, K. P. 2014. *The SAARC Food Bank for Food Security in South Asia*. Kathmandu: South Asia Watch on Trade, Economics and Environment (SAWTEE).
- ⁶ FAO. 2011. *Save and Grow- A Policy Maker's Guide to the Sustainable Intensification of Smallholder Crop Production*. Rome: United Nations Food and Agriculture Organization.
- ⁷ Montpellier Panel. 2013. *Sustainable Intensification: A New Paradigm for African Agriculture*. London: Agriculture for Impact.
- ⁸ FAO. 2014. *Building a Common Vision for Sustainable Food and Agriculture (Principles and Approaches)*. Rome: United Nations Food and Agriculture Organization.
- ⁹ *ibid.* Note 6.
- ¹⁰ ADB. 2016. *Asian Water Development Outlook 2016: Strengthening water security in Asia and the Pacific*. Mandaluyong City, Philippines: Asian Development Bank.
- ¹¹ Erisman, J. W., J. Galloway, M. S. Sutton, Z. Klimont and W. Winiwater. 2008. "How a Century of Ammonia Synthesis Changed the world". *Nature Geoscience*, 636-639.
- ¹² Martin, C. 2015. *Agrobiodiversity – the key to food security, climate adaptation and resilience*. Bonn and Eschborn, Germany: Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ).
- ¹³ a. Nelson, G. C. 2009. *Overview-Agriculture and Climate Change: An Agenda for Negotiation in Copenhagen*. Policy Brief No 1 May 2009. Washington DC: International Food Policy Research Institute (IFPRI).
b. OECD. 2008. "Towards Sustainable Agriculture". OECD Contribution to the United Nations Commission on Sustainable Development 16.
- ¹⁴ IFPRI. 2016. *Global Hunger Index*. Accessed 25 May 2017. <http://ghii.ifpri.org/>
- ¹⁵ *ibid.*
- ¹⁶ IFAD. 2011. *Agriculture – Pathways to Prosperity in Asia and the Pacific*. Rome: International Fund for Agricultural Development, Asia and Pacific Division.
- ¹⁷ WTO. 2015. *International Trade Statistics 2015*. Geneva: World Trade Organization (WTO).
- ¹⁸ *ibid.* Note 5.
- ¹⁹ Thapa, G. 2009. *Smallholder Farming in Transforming Economies of Asia and the Pacific: Challenges and Opportunities*. Discussion paper for 33rd Governing Council of International Fund for Agricultural Development. Rome: IFAD.
- ²⁰ Sen, Amartya. 1988. *Poverty and Famines: An Essay on Entitlement and Deprivation*. Oxford: Clarendon Press.



Climate risks and sustainable intensification of agriculture in South Asia

Simrit Kaur and Harpreet Kaur

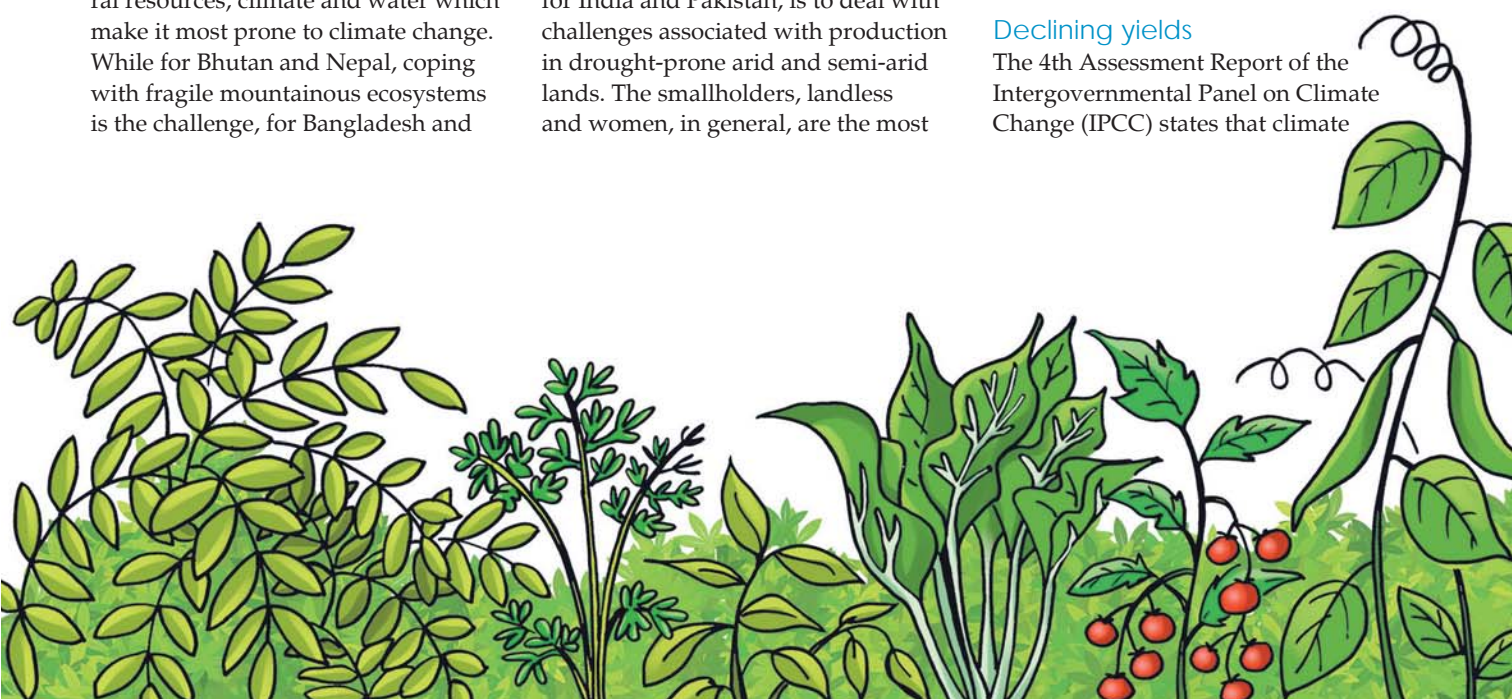
Agricultural production is highly vulnerable to availability of natural resources, climate and water which make it most prone to climate change. While for Bhutan and Nepal, coping with fragile mountainous ecosystems is the challenge, for Bangladesh and

Sri Lanka, it is coping with the low-lying coastal areas. Equally challenging, for India and Pakistan, is to deal with challenges associated with production in drought-prone arid and semi-arid lands. The smallholders, landless and women, in general, are the most

vulnerable as their ability to bear risk is extremely low.

Declining yields

The 4th Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) states that climate



change, especially associated with increased risk of floods and droughts, is expected to have a severe impact on South Asian countries, as these economies rely mainly on agriculture, natural resources, forestry and fisheries. Most models project a decrease of up to 30 per cent in yields in the region by the middle of the 21st century. For instance, with a 2-4°C temperature increase, rice yields are expected to decline by 75 tons/ha.

South Asia's agriculture is primarily rain-fed with small land holdings. The average size of land holdings ranges from 0.5 hectares in Bangladesh to 1.4 hectares in India. Women play a significant role in agriculture, such as in the production of high-value vegetable crops; home-garden cultivation; and in the raising of animals. In India, for instance, the agriculture sector employs close to 80 per cent of all economically active women in the country. In Sri Lanka too, over 40 per cent of women work in agriculture; in Bhutan, the figure is over 60 per cent.¹

Despite the importance of agriculture in rural lives, as in 2016, the contribution of agriculture to GDP (Figure

South Asia's agriculture is rain-fed with small land holdings where women play a significant role.

1a) was lower than 20 per cent for Sri Lanka, Maldives, India, Bhutan and Bangladesh. For Pakistan and Afghanistan, however, the same is above 20 per cent, but below 30 per cent. Nepal is the only country in the region where agriculture contributes in excess of 30 per cent to GDP. An associated challenge is the declining contribution of agriculture to GDP (Fig 1b), without a corresponding decline in the number of people earning their livelihood from agriculture.

Enhanced allocations to public investments in agricultural research and development, rural infrastructure and education help sustain long-term growth in agricultural production. An important way to assess whether government expenditure on agri-

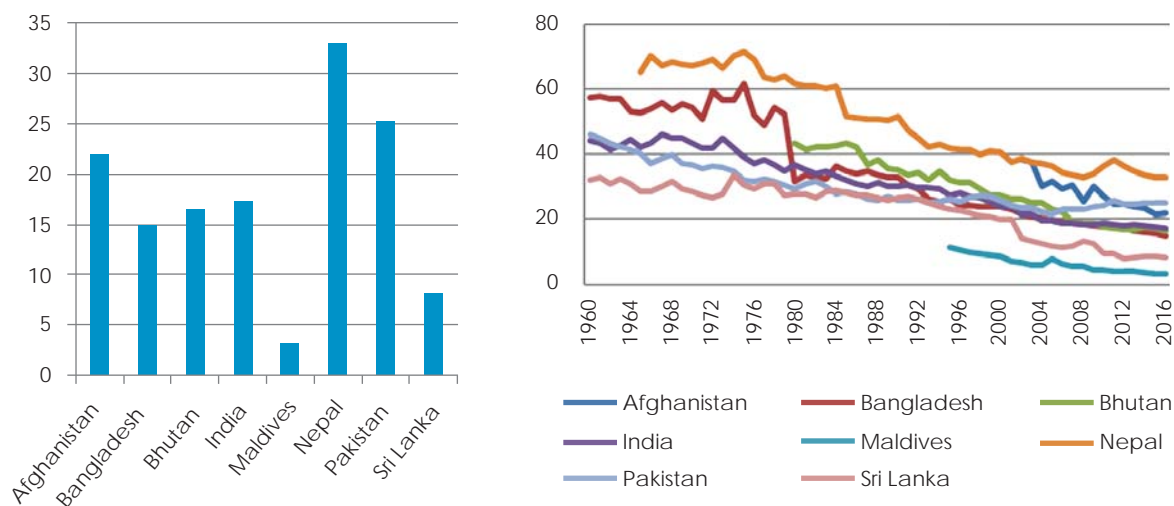
culture reflects the economic importance of the sector is the Agricultural Orientation Index (AOI). It is the share of agriculture in total government expenditure divided by the share of agriculture in total GDP. South Asia's AOI was only 0.27 in 2005-07, a value lower than all regions of the world (except Sub-Saharan Africa). The AOI for East Asia and the Pacific was the highest at 0.59, followed by Latin America and the Caribbean at 0.38.

High food insecurity

South Asia is home to about 40 per cent of the world's undernourished people. Though the prevalence of undernourishment is higher in Sub-Saharan Africa at 23 per cent (compared to 16 per cent for South Asia), the food security situation in the region is worrisome due to the higher absolute numbers. The number of malnourished people in India stands at a staggering 194.6 million, or about 24.5 per cent of the total undernourished people in the world.³ Pakistan, Bangladesh, Afghanistan, Sri Lanka and Nepal have about 15, 9.5, 3.0, 1.7 and 0.8 per cent, respectively.

Figure 1 (a, b)

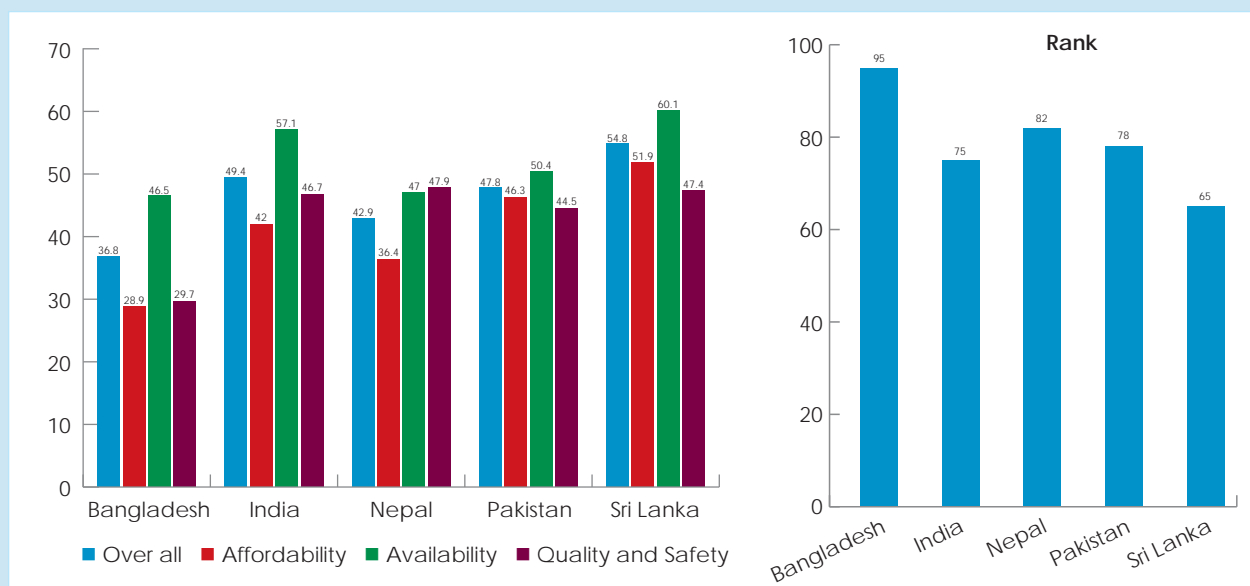
Agricultural value added as percentage of GDP in 2016 (1a) and over time (1b)



Source: Based on Data from World Development Indicators, World Bank²

Figure 2

Food Security in South Asia as measured by Score (2a) and Rank (2b)



Source: Based on data from Global Food Security Index (GFSI), 2016⁴

The Global Food Security Index (GFSI) considers the core issues of affordability, availability and utilization. Each of these is shown in Figure 2. It represents the overall GFSI Index for five South Asian countries along with their sub-indices of Affordability, Availability and Quality and Safety (Figure 2a) and the rank of these five countries (Figure 2b).

Climate risks

Predicted increase in global temperatures could lead to a rise in seawater levels resulting in a reduction of

available agricultural lands along with the influence on growing conditions for different crops. Increases in temperature and erratic rainfall patterns can lead to short-run crop failures and long-run production declines, posing a serious threat to food security.

The 2017 Global Climate Risk Index⁵ (CRI) analyses the extent of exposure and vulnerability of countries to extreme events (such as floods, storms, landslides, freezing, droughts, wildfires, hail, tornadoes) by considering the fatalities and economic losses caused by the disasters. Table below

provides the Climate Risk Index for select South Asian countries for 1996 to 2015 period. Over the period, Bangladesh and Pakistan were the two most vulnerable countries with respect to Climate Risk. Their respective CRI Ranks are 6 and 7. On an average, they have been losing close to 0.7 per cent per annum GDP since 1996. India's per annum GDP loss associated with climate change has been estimated to be 0.27 per cent. Amongst other South Asian countries, Nepal, Sri Lanka and Bhutan's respective per annum GDP losses

Table

Climate Risk Index for South Asian economies (1996–2015)

	CRI Rank	Country	CRI Score	Fatalities (annual average)		Fatalities per 100,000 inhabitants (annual average)		Losses per unit GDP in %	
				Average	Rank	Average	Rank	Average	Rank
1	6	Bangladesh	25.00	679.05	9	0.48	34	0.7324	31
2	7	Pakistan	30.50	504.75	10	0.32	49	0.6469	35
3	14	India	37.54	3589.75	2	0.32	50	0.2756	6
4	24	Nepal	44.33	235.40	18	0.92	19	0.2314	66
5	54	Sri Lanka	64.33	44.50	50	0.23	67	0.1743	74
6	109	Bhutan	98.17	1.45	139	0.22	68	0.1583	80

Source: Global Climate Risk Index (CRI), 2017⁶

have been estimated to be 0.23 per cent, 0.17 per cent and 0.15 per cent.

Among the South Asian countries, Bangladesh is the most vulnerable to extreme weather events, while Sri Lanka and Bhutan reportedly have a lower susceptibility to weather disasters. Maldives is amongst the least “weather disaster”-prone countries in the world. While the highest absolute number of deaths in the region occurred in India, the highest deaths per 100,000 inhabitants took place in Nepal. The largest loss per unit of GDP was in Bangladesh.

The IPCC reports that by the mid-21st century, South Asia will continue to be the most food-insecure place exacerbated by declining agricultural productivity. Rice, a key staple, is most vulnerable in the northern part of South Asia. However, changes in climate may boost wheat production in parts of Pakistan, where warmer temperatures would make it possible to grow at least two crops per year of wheat and maize in mountainous areas. Under elevated temperature and CO₂ conditions, the tropical and subtropical regions of Bangladesh, Bhutan, India, and Sri Lanka are expected to experience a decline in rice yield by as much as 23 per cent by 2080s.⁷ However, for Nepal, increases in both temperature and CO₂ levels are projected to cause an increase in rice production in the colder hills and mountains by as much as 16 per cent by 2080s. Similarly, the rice yield in Bhutan is projected to increase by the 2030s, but will begin to decline by the 2050s. For almost all crops irrespective of the climate change scenario considered, South Asia will experience the greatest yield decline over the 2000 to 2050 period.⁸

Policy actions

Adapting to climate change could be at the national, international, regional, local or household level. Pro-active measures include building of dykes, irrigation, water storage capacity and flood protection. Households also adapt by planting different crops, using better variety of seeds, altering

the timing of plantation, livelihood diversification and, sometimes, migration. Diversification of crops, introduction of short cropping varieties, use of heat/moisture-tolerant varieties and crop insurance are steps in the right direction.

Countries in South Asia have developed their own National Adaptation Programmes. Bangladesh’s National Adaptation Programme of Action (NAPA) was set up in 2005. Nepal’s action plan came up in 2010. Several countries have also developed national climate change strategies and action plans, including the Bangladesh Climate Change Strategy and Action Plan (BCCSAP), the National Climate Change Adaptation for Sri Lanka (2011-2016), the National Action Plan on Climate Change in India, and the draft National Climate Change Policy in Pakistan.

In Bangladesh, the Reducing Vulnerability to Climate Change (RVCC) project was implemented in six districts in its southwest between 2002 and 2005. The initiative focuses on new livelihood strategies including rearing goats, ducks, chickens and crabs; tree planting; introduction of salt-water tolerant vegetable gardens and handicraft production.

India often focuses on enhancing adaptive capacity of the arid and semi-arid regions vulnerable to droughts and erratic rainfall. Water conservation is done through “bunds” as well as concrete rainwater cisterns to collect surface water in the rainy season. Additionally, the Government of India’s ‘The National Climate Resilient Agriculture Programme’ invests in research and development on adaptive conditions of specific crop

varieties and dissemination of climate related information and extension services.

In Nepal, improved breeds of goats are being promoted, as livestock provides food, income and drought security. Cross-breeding with non-native breeds is also being promoted to improve resilience and productivity. In Pakistan, demonstration sites, though not very successful, were set up to raise community awareness of livestock management techniques and organic vegetable farming. In Bhutan, mandarin production, which gets severely affected by long dry spells in the flowering season, now uses bamboos for drip irrigation.

Despite these measures, adaptation efforts in these countries have so far been fragmented, and often not scaled up. Two such challenges are hereby discussed:

Strengthening agricultural food production systems: Increasing public investments in agricultural research and development, rural infrastructure and education can help sustain long-term growth in agricultural production.⁹ However, government expenditure on agriculture as percentage of total expenditure has been declining, as Figure 3 reflects.

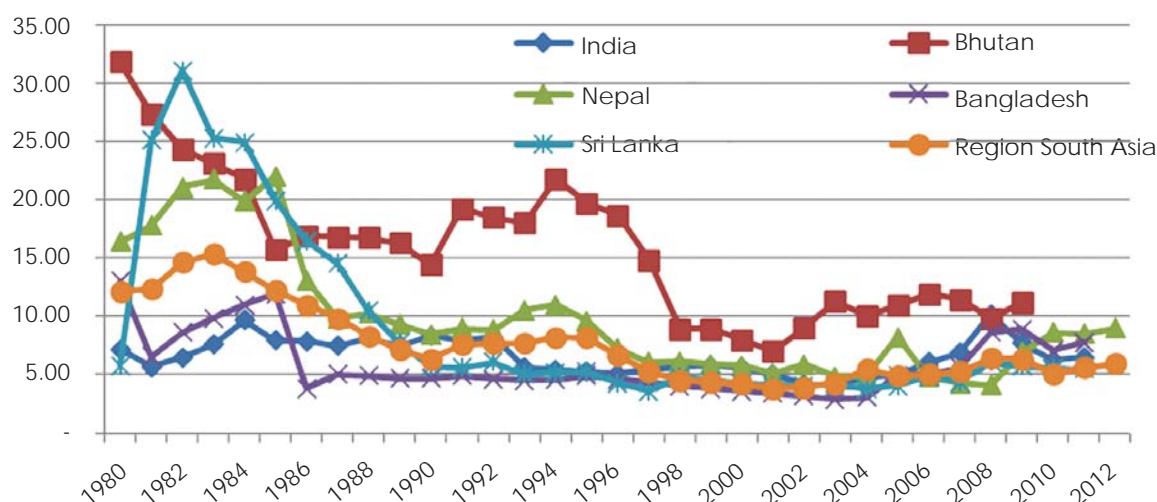
Urgent steps need to be initiated to improve the resilience of the vulnerable sections of the population. Research on productivity and breeds, development of rural infrastructure, improving food safety nets and institutional innovations, such as farmers’ cooperatives are proposed to overcome the challenges. All this requires agricultural investments. Here, public-private partnerships may be promoted to generate capital.

Water security and irrigation in South Asia: The Asian Water Development Outlook (AWDO) 2013 has prepared a composite Water Security indicator that ranges from 1 (worst situation) to 5 (ideal situation).¹⁰ According to the report, South Asia is a global “hot spot” with countries in the region having low national water security indices. Within South Asia, Bhutan, Maldives, Nepal and Sri Lanka have

Increasing public investments in the sector can help sustain long-term growth in agricultural production.

Figure 3

Government expenditure on agriculture as percentage of total expenditure



Source: Authors' depiction based on World Development Indicators (WDI), 2015 data¹¹

a National Water Security Index of 2. Afghanistan, Bangladesh, India and Pakistan have a lower value at 1.

While enhancing irrigation remains important, improvement in irrigation management systems cannot be negated either. Sprinkler and drip irrigation and rainwater harvesting ensuring "more crop per drop" are steps in the right direction that need to be scaled up.

More cooperation needed

Finally, to avoid wasteful duplication and for ensuring efficiency in utilization of limited resources, regional cooperation is desired. Asian regional research organizations, such as the Asia-Pacific Association of Agricultural Research Institutions (APAARI) and the South Asian Association for Regional Cooperation (SAARC) could take an initiative towards regional co-operation for food security. APAARI should strengthen agriculture and agri-food research and innovation systems through partnerships and collaboration, capacity development and advocacy for sustainable agri-

cultural development in the region. Countries, too, could take the lead by sharing their best practices. Such initiatives would go a long way towards strengthening capacity to mitigate the adverse impact of climate change on agriculture and food security. ■

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Notes

- 1 Stabinsky, Doreen. 2014. *Defining Role of Agriculture in South Asia*. Dhaka: Climate Action Network South Asia.
- 2 World Development Indicators dataset <https://data.worldbank.org/>
- 3 FAO, IFAD and WFP. 2015. *The State of Food Insecurity in the World 2015. Meeting the 2015 international hunger targets: taking stock of uneven progress*. Rome: Food and Agriculture Organization of the United Nations.
- 4 EIU. 2016. *Global Food Security Index 2015: An assessment of food affordability, availability and quality*. London: Economist Intelligence Unit. foodsecurityindex.eiu.com/Downloads.
- 5 Kreft, Sönke, David Eckstein, and Inga

Melchior. 2016. Global Climate Risk Index 2017. Germanwatch.

⁶ *ibid.*

⁷ ADB. 2015. *The Economics of Climate Change in South Asia Adaptation and Impact Assessment*. Mandaluyong City: Asian Development Bank. https://www.adb.org/sites/default/files/publication/39302/casa-update-3-economics-climate-change_0.pdf

⁸ Nelson, G. C., Rosegrant, M. W., Koo, J., Robertson, R., Sulser, T., Zhu, T., Ringler, C., Msangi, S., Palazzo, A., Batka, M., Magalhaes, M., Valmonte-Santos, R., Ewing, M. and D.R. Lee. 2009. *Climate change impact on agriculture and costs of adaptation*. (Vol.21). Washington, DC: International Food Policy Research Institute.

⁹ a Fan, S., Gulati, A. and S. Thorat. 2008. "Investment, subsidies, and pro-poor growth in rural India". *Agricultural Economics*, 39(2), 163–170;

b Fan, S., P. Hazell and S. Thorat. 2000. "Government spending, agricultural growth and poverty in rural India", *American Journal of Agricultural Economics* 82, no. 4, pp. 1038–1051.

¹⁰ A national water security index reflects the water security situation in the country. Index value of 1: "hazardous"; index value of 2: "engaged"; index value of 3: "capable"; index value of 4: "effective"; index value of 5: "ideal" situation.

¹¹ *ibid.* Note 2.

South Asia's food security investment riddled with niceties

Krishna Prasad Pant

In this age of technology and trade liberalization, food insecurity is usually the result of bad policy choices. And, a trade-dependent food supply too is affected by the global food security situation. The world population is expected to exceed nine billion by 2050. Meeting the food demand then will require an increase in food production by 70 per cent from the 2005-07 levels.¹

Basic right

The 'Zero Hunger' initiative was launched to end hunger, achieve food security and improve nutrition and promote sustainable agriculture by 2030, as a part of achieving the Sustainable Development Goal Two. This goal targets doubling of agricultural productivity and incomes of small-scale food producers by 2030.

The right to food is recognized as an inalienable right. Still, a large section of South Asians suffer from hunger. The share of undernourished population is still high in South Asian countries (Table 1). The proportion of stunted and underweight children is highest in India, followed by Pakistan and Nepal.

Many people lack secure access to sufficient amounts of safe and nutritious food for normal growth and healthy life. Food security requires adequate food availability, easy accessibility, year-round stability and proper utilization.

The green revolution adopted in the 1960s has, indeed, improved food production in South Asia. But, food security is still a major challenge for individual national governments. The share of the agriculture sector in the economy is decreasing giving way to industrial and services sectors that have been expanding. In spite of their engagement in agriculture, their efforts to increase production produce

limited results due to scarcity of land and water. Land degradation, plant nutrient deficiency and climate change make the task even harder.³

There are longer-term challenges as well. Climate change is intensifying the frequency and intensity of extreme events such as floods, cyclones and droughts. It also leads to water shortages during needy times. This is perhaps the single most important long-term challenge faced by humankind, which is likely to impact areas beyond food supply.

Investment areas

Food security challenges call for investment in research and development

Table 1
Status of food insecurity in select countries of South Asia

	Bangladesh	India	Nepal	Pakistan	Sri Lanka
Prevalence of undernourishment (%)	16.4	15.2	7.8	22.0	22.0
Stunted children (%)	36.1	47.9	40.5	45.0	14.7
Underweight children (%)	32.6	43.5	29.1	31.6	26.3
Intensity of food deprivation (kcal/person/day)	116	109	51	172	192

Source: Global Food Security Index (2016)²

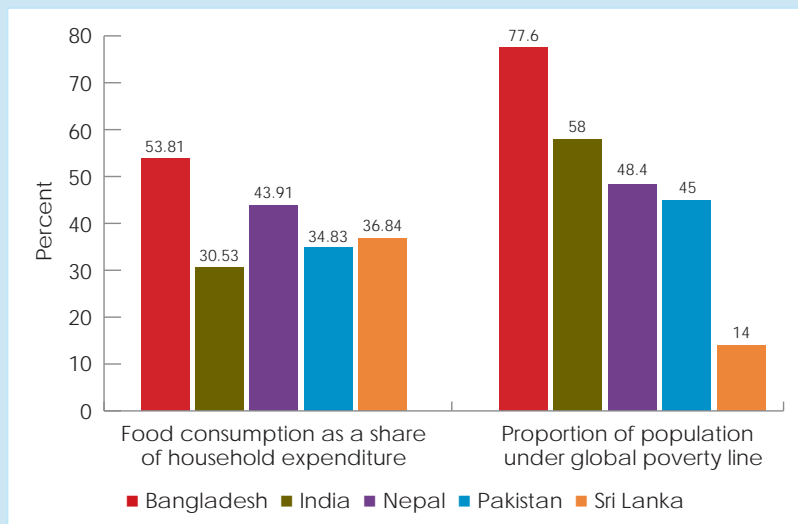
of food production and processing technologies and climate resilience agriculture. The difficult questions are: how much should such investment be and which part of agriculture should it focus on? Though people in the non-agricultural sector are earning more than those in agriculture, many still choose the agricultural occupation because of less mobile agricultural resources like land and labour and low skill requirement.

Better productivity requires proper use of water and external inputs like improved seeds, fertilizers, plant protection chemicals and machineries. Utilization of surface water and ground water for irrigation demand huge investments. Climate change may have also degraded soil-water ecosystems, increased biotic and abiotic stresses and increased post-harvest losses. Mitigation of these problems needs controlled farming of crop, livestock and poultry. Such systems also need huge investments, both at the national and regional levels. Large investments are also needed in research and development for understanding climate change impacts and developing technologies for mitigation. Modernization of agricultural education to develop high quality human resources in agriculture and allied subjects is another area that calls for such investments.

Investment in agriculture affects all four aspects of food security—availability, access, stability and utilization. Investment in irrigation, land improvement, fertilizer supply, improved seeds and mechanization help in increasing food production, which enhances food availability. Investment in cash crops, livestock and poultry production increases farmers' income, which, in turn, increases their access to food and its affordability. Access to food is also affected by resource mobilization. And, this depends on the physical, social and policy environment. Shocks like drought and social conflict compromise the future productive potential of households affecting their future food security.⁴

Figure

Status of poverty affecting food consumption



Source: Global Food Security Index⁵

Agricultural investment also increases food stability as farmers can have access to food throughout the year. Similarly, investment in agricultural production also helps utilization. It provides the condition for safe and balanced food consumption among people, thus improving their rate of food utilization.

Other areas of agricultural investment are food security monitoring, early warning and production forecast, agricultural innovation and creating a conducive atmosphere for the private sector to join in. Regional mechanisms are necessary to generate and disseminate timely and precise data on food production, consumption and stocks. Such information must be made transparent. Regional food policies need to be developed to support national investment in food security efforts.

Economic crisis and unemployment affect mostly those people who spend a significant portion of their income on securing food.⁶ The percentage of income that goes to food is higher in Bangladesh and Nepal compared to other South Asian countries (Figure 1). The proportion

of population below the poverty line is higher in Bangladesh and India than in other countries in the region.

Climate change is expected to bring a substantial reduction in aggregate crop production by the end of the century and the effect will be larger on wheat than on rice yields.⁷

Investing in climate change adaptation in South Asia's agriculture increases the chances of sustaining agricultural productivity, stabilizing food prices and reducing the pressure of bringing new lands under cultivation in land-scarce areas.⁸ Another threat to food security comes from biofuel, which is set to compete with food production for land and other resources. Any increase in fuel prices may lead to increases in global food prices, thus affecting the poor and vulnerable sections.

It is usually women who not only produce but also prepare food in South Asia. They are involved in every step along the food production chain. Though women's role in food security is admitted, no index is yet available to measure the extent of their actual contribution to household food security. Some studies show that wom-

en are the pivot of household food security. It is also reported that men consume more food than women and boys consume more than girls in many households.

Public investment

Low returns from agriculture discourage the private sector from investing in the sector. The hesitation in private investment in agriculture's capital formation is mainly due to limited availability of public goods, particularly physical infrastructure. Identification of policy measures for public investment in agriculture is necessary for food security and livelihood in South Asian countries. Investment in capital formation influences the pace and pattern of agricultural development, food security and livelihood of the farming communities, particularly women. Budgetary outlays have been increasing in agriculture, forestry and fisheries in Bangladesh and Sri Lanka, while for others it shows a decreasing trend (Table 2).

The region, however, has witnessed a significant increase in agricultural budgetary allocation in just a decade—nearly five times in India and Nepal and three times in Pakistan. Other countries have had a less spectacular increase. The share of agricultural spending, in the total budget, ranges from one to 15 per cent in South Asian countries—the lowest in Pakistan and the highest in Nepal

(Table 3). Agriculture's share in the budget (agriculture, forestry, fishery) was increasing in almost all South Asian countries till 2008, but started to decline thereafter, except in Nepal.

Public investment in Nepal's agriculture is on the rise, too, albeit a larger part of it is recurrent expenditure rather than capital expenditure. Since capital formation is needed to change the agricultural scenario, this is not a healthy sign. Capital formation, in the form of infrastructure, improvement in quality of natural resources and assets and creation of productive assets, are necessary for agricultural development. Capital formation supports the overall development process by improving the stock of equipment and tools and productivity of the resources employed. Gross fixed capital (GFC) formation in agriculture per hectare of land varies between US\$ 2,000 to 7,000 in South Asia, the highest being in Bangladesh followed by Pakistan.⁹

Policy options

Policy choices regarding food security centre on: (i) efficient growth of agriculture and food production; (ii) improved income distribution, primarily through efficient employment creation; (iii) satisfactory nutritional status for the poor; and (iv) adequate national food security insurance against bad harvests, natural disasters and uncertain world food supplies and prices.¹⁰ The importance of each

of these policy measures depends on the country. Insuring against natural disasters is more important for Bangladesh than other countries in the region, while improved income for purchasing food is important for the Maldives where the food production base is weak.

Tariff on food imports too plays an important role. Low import tariff supports the poor by making food more affordable while, at the same time, it makes domestic production largely unprofitable. While the former affects plans to increase food security, the latter effect is a food insecurity warning. High tariff on food imports supports domestic food producers, but increases price, thus denying the poor any access to food. This shows the complexity that policymakers face while making the right choice among various policy options.

Some sort of social safety net is used by most South Asian countries to support their poor. In India, four per cent of its GDP goes to such safety nets; Bangladesh spends 5.3 per cent.¹¹ The safety net programmes come in the form of consumer food price subsidies, food-for-work programmes, feeding programmes and cash transfers. Still, many of the poor are reportedly excluded by these programmes.¹²

The Asian Development Bank has recommended some food security policies for the Asian region.¹³ Among these, the short run policies include

Table 2

Outlays in agriculture, forestry and fisheries in South Asia (US\$ million)

	2001	2005	2010	2011	2012	2013	2014	2015
Afghanistan	-	-	603.87	-	-	243.07	-	-
Bangladesh	237.96	368.74	-	-	1293.43	1972.89	-	-
Bhutan	15.96	26.86	60.74	84.79	91.12	83.56	69.56	64.58
India	3862.34	6412.48	20882.95	20460.26	19271.96	19080.57	-	-
Maldives	3.21	4.82	11.46	6.39	-	-	-	-
Nepal	-	102.35	274.01	401.66	362.85	495.98	483.18	471.41
Pakistan	68.4	51.2	1049.14	411.86	487.21	854.52	232.41	-
Sri Lanka	156.64	234.24	609.79	677.05	601.71	516.16	795.63	1072.55

Source: FAOSTAT¹⁴

Table 3

Proportion of agricultural budget in the total budget (US\$ million)

	2001	2005	2006	2007	2008	2009	2010	2011	2012	2013
Afghanistan	–	–	4.68	7.45	2.97	4.26	4.68	–	–	1.81
Bangladesh	4.65	5.39	5.21	5.79	8.81	8.95	0.00	0.00	8.96	11.08
Bhutan	7.03	10.97	11.94	11.50	9.83	11.18	10.99	13.55	14.13	13.61
India	5.03	4.98	6.06	6.54	10.18	7.70	7.49	7.42	6.32	5.97
Maldives	1.35	1.07	1.59	2.16	1.54	0.53	1.33	0.74	–	–
Nepal	–	8.23	4.77	4.28	4.11	6.86	8.63	11.15	10.49	14.81
Pakistan	0.57	0.28	3.32	4.08	7.13	4.40	3.06	1.03	1.19	1.92
Sri Lanka	3.63	3.98	4.80	4.41	5.88	5.46	5.33	5.29	4.87	3.95

Source: FAOSTAT¹⁵

providing timely and reliable data and information, coordinating crisis policy responses, facilitating flows of emergency assistance and reducing agricultural trade restrictions and market distortions. In the long run, the policy recommendations are to (i) promote research and development, knowledge exchange and capacity building; (ii) improve monitoring and surveillance of food market conditions; (iii) promote food trade liberalization; (iv) consider mechanisms to promote price stability, such as regional and international food reserves; and (v) enhance collaboration on climate change and accelerate adaptation measures.¹⁶ Obviously, all these need investment.

Efforts are also needed to strengthen global funding to support agriculture, increase knowledge-sharing opportunities, enhance capacity and skills, support policy and strengthen extension services for increased production and distribution of food in the region. Policy in the region must be geared towards attracting the youth in agriculture, develop new technologies for irrigation, plant nutrient management, fodder-based animal nutrition management, biotechnology, food technology and post-harvest management. Regional policy must also focus on food trade, food transport, support to agriculture, exchange of plant and animal genetic resources and operationalizing of the regional food bank.

Sustained food production and

income generation to achieve food security is not possible without investment. Such investment needs to specifically target regional scientific research and development, education and training, technology transfer and scale-ups, infrastructure development for food production, income generation support and the development of a resilient society. Though it takes a long time, investment in agricultural research has high economic returns.

Political commitment is needed at the highest level for regional cooperation in food security. Support may be required to facilitate both imports and exports. Humanitarian Food Aid should be focused on acute crisis areas. It should not be allowed to dampen the normal food market. Though food-based biofuel production is very limited in the region, it should be ensured that biofuel does not compete for resources with food production. ■

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Notes

¹ High level expert forum, How to feed the world in 2050, 2009 bit.ly/1qN9Ww5

² EIU. 2016. *Global Food Security 2017*. London: Economist Intelligence Unit.

³ MacIntyre, B., H. Herren, J. Wakhungu, and R. Watson. 2009. *IAASTD (International Assessment of Agricultural Knowledge, Science and Technology for Development): Agriculture at a Crossroads Synthesis Report*. Washington, DC: Island Press.

⁴ Riely, F., N. Mock, B. Cogill, L. Bailey and E. Kenefick. 1999. *Food security indicators and framework for use in the monitoring and evaluation of food aid programs*. Arlington, Va: Food Security and Nutrition Monitoring Project (IMPACT), ISTI, Inc., for the U.S. Agency for International Development.

⁵ *ibid.* Note 2.

⁶ Chatterjee, B. and M. Khadka. 2011. *Climate Change and Food Security in South Asia*. Jaipur, India: CUTS International

⁷ ADB. 2013. *Food security in Asia and the Pacific*. Mandaluyong City, Philippines: Asian Development Bank.

⁸ Lobell, D., U. Baldos, and T. Hertel. 2013. "Climate Adaptation as Mitigation: The Case of Agricultural Investments". *Environmental Research Letters* 8 (1). 1–12.

⁹ FAOSTAT

¹⁰ C.P. Timmer, W. Falcon, and S. Pearson. 1983. *Food Policy Analysis*. World Bank: Johns Hopkins University Press.

¹¹ ADB. 2008. *Social Protection Index for Committed Poverty Reduction. Vol. 2: Asia*. Mandaluyong City, Philippines: Asian Development Bank. <http://www.adb.org/sites/default/files/spi-poverty-reduction-v2.pdf>

¹² Jha, S., A. Kotwal and B. Ramaswami. 2013. *Safety Nets and Food Programs in Asia: A comparative study*. ADB Economics Working Paper 371. Mandaluyong City, Philippines: Asian Development Bank.

¹³ ADB. 2013. *Food security in Asia and the Pacific*. Mandaluyong City, Philippines: Asian Development Bank.

¹⁴ FAOSTAT

¹⁵ *ibid.*

¹⁶ *ibid.* Note 13.

Cross-border paperless trade

An inclusive platform

The Framework Agreement is fully dedicated to enabling seamless electronic exchange. It heralds a legal recognition of trade-related data and documents across borders

Sung Heun Ha, Tahseen Khan and Yann Duval

On 19 May 2016, the Framework Agreement on Facilitation of Cross-border Paperless Trade in Asia and the Pacific (FA-CPT)¹ was adopted by the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP), making it the newest United Nations (UN) treaty in the area of trade and development. The Framework is fully dedicated to enabling seamless electronic exchange. It heralds a legal recognition of trade-related data and documents across borders. This is expected to greatly reduce transaction time and costs.

Inclusion of variety

Developed over four years by a very diverse group of more than 25 Asian and Pacific countries, at very different stages of development, it is expected to benefit all participating countries, regardless of where they stand in terms of trade facilitation implementation. While the preparatory work was spear-headed by Republic of Korea, Bangladesh was the first to announce Cabinet approval for the signing of the Agreement. Bangladesh, Cambodia and China formally signed it in Bangkok on 29 August, and Armenia and Iran signed it in New York in September. Other countries are expected to join through direct accession during 2018. It will enter into force after ratification by five Member States.

Achieving cross-border paperless trade across the region cannot be

achieved without close collaboration among countries. The agreement is expected to support that process by providing a dedicated institutional framework. Countries with proven political will can use it to develop legal and technical solutions for cross-border paperless trade, including through pilot projects, capacity building and technical assistance.

The FA-CPT provides a unique tool to countries to better implement the World Trade Organization (WTO) Trade Facilitation Agreement (TFA) using digital solutions. Importantly, the Framework promotes existing international standards, tools and instruments, including those of the UN Commission on International Trade Law (UNCITRAL) as well as those of the UN Centre for Trade Facilitation and Electronic Business (UN/CEFACT) and World Customs Organization (WCO). UNCITRAL provided substantive support for the development of the Framework throughout the process.

The preliminary results of the 2nd UN Global Survey on Trade Facilitation and Paperless Trade Implementation was presented at the Sixth Global Review of Aid for Trade at the WTO in Geneva, in July 2017. The survey says that countries have been making significant progress in implementing trade facilitation for the past two years. This is possibly due to countries rushing to prepare for the implemen-

tation of the WTO TFA, which entered into force on 22 February 2017.

In Asia and the Pacific, the overall average implementation rate of paperless trade measures stands at 50 per cent in 2017, compared with 46.5 per cent in 2015. The rate is highest in East and South-East Asia and lowest in South Asia and the Pacific Islands (see Figure). In South Asia, India leads in implementation, followed by Pakistan, Sri Lanka and Bangladesh.

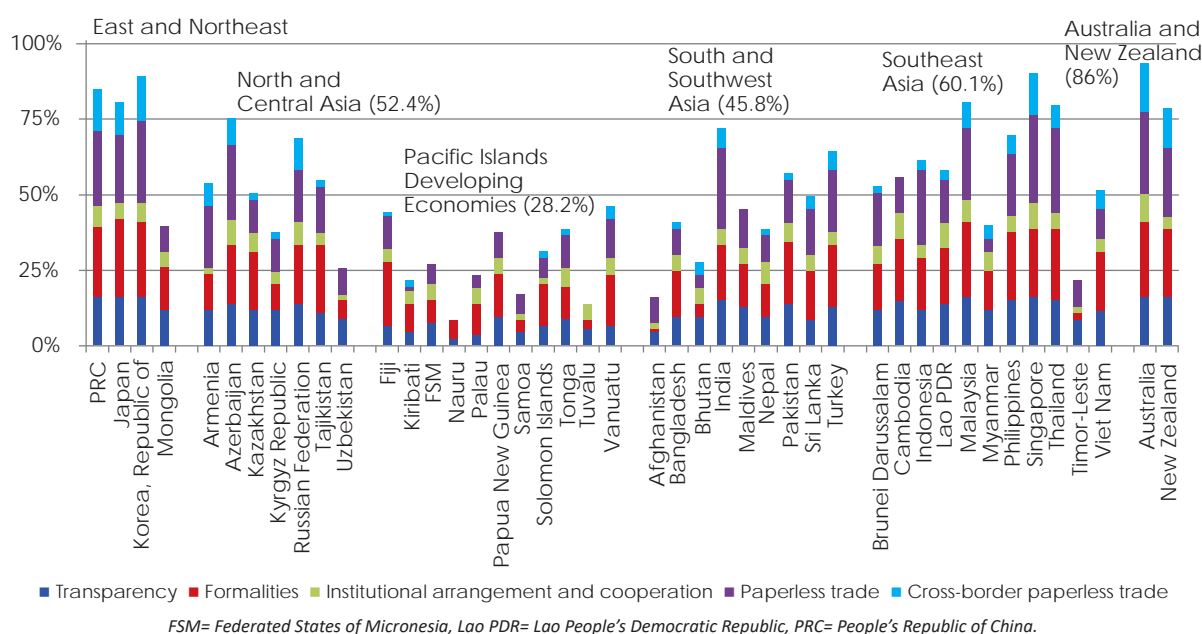
According to the Survey, significant progress has been made in implementing measures specified in the TFA.² However, implementation of measures related to automation of trade procedures and use of electronic data and documents is still lagging in many countries.

Still, the average implementation rate of such measures (including electronic exchange of Certificates of Origin, or of Sanitary or Phyto-Sanitary Certificates) stands at less than 20 per cent, compared to more than 50 per cent for most other types of trade facilitation measures. This makes the FA-CPT both relevant and timely.

A number of Asian and Pacific countries began implementing paperless trade systems from the late 1990s and early 2000s. The economic gains have been significant, as in the cases of the Republic of Korea and Singapore.³ Most of the systems in the region have focused on facilitating information exchange between domestic stake-

Figure

Implementation of trade facilitation and paperless trade measures in Asia and the Pacific economies (2017)



Source: UN Survey on Trade Facilitation and Paperless Trade 2017⁴

holders. The flow of electronic trade information generated domestically encounters both technical and legal barriers beyond the border. This requires traders to maintain conventional paper-based trade practices. The overall benefits and return on investment are thus reduced.

Article 1 of the FA-CPT lays down the objective: “to promote cross-border paperless trade by enabling the exchange and mutual recognition of trade-related data and documents in electronic form and facilitating interoperability among national and sub-regional single windows and/or other paperless trade systems, for the purpose of making international trade transactions more efficient and transparent while improving regulatory compliance”. To do so, it provides Parties an enabling and structured intergovernmental framework.

The FA-CPT contains a preamble and 25 articles. It is characterized by the following key features:

- A set of key principles to promote connectivity and trade facilitation,

including functional equivalence, promotion of interoperability, improved trade facilitation and regulatory compliance, and cooperation between public and private sectors

- A multi-layered institutional arrangement as an operating platform: a Council at high level as a decision-making body; a Standing Committee at senior official level as an operative body; and Working Groups, at expert level, as substantive supportive bodies
- A commitment to enabling mutual recognition of trade-related data and documents: Recognition would be provided on the basis of a substantially equivalent level of reliability. Implementation of such mutual recognition may involve bilateral and (sub)-regional arrangements at the operational level.
- A comprehensive action plan to address legal and technical issues to be developed and implemented by the Parties after entry into force of the Agreement. It will include,

among other things, development of technical and legal measures, detailed actions for designing pilot projects and subsequent actual projects, capacity building support and information and experience sharing activities among Member States. The collective implementation of the action plan is expected to result in the emergence of practical standardized solutions and protocols for cross-border paperless trade.

Implementation of cross-border paperless trade in Asia and the Pacific is expected to reduce export costs by 15 to 30 per cent on average and increase the annual export potential of the region by US\$257 billion.⁵ At the country level, for example, Sri Lanka's total transaction costs are expected to decrease by US\$240 million, annually. Expected benefits for ESCAP Member States can be summarized as follows:

- Accelerated progress towards a paperless trade environment at the national level on the basis of the

political will demonstrated during the FA-CPT accession process;

- Opportunity to integrate emerging cross-border paperless trade considerations and best practices early in the development of national paperless trade systems to ensure they are interoperable and enabled for (future) cross-border data exchange, in particular through structured and regular sharing of lessons;
- Reduction in overall investment costs and maximization of return from investments in paperless trade systems, through concurrent development of national paperless trade systems and environment for cross-border trade data exchange;
- Ready access to potential counterpart countries interested to negotiate and achieve cross-border data exchange, avoiding or reducing needs for engaging in numerous and/or potentially incompatible bilateral initiatives;
- Direct participation in the development of pragmatic solutions for the cross-border exchange of trade documents, with opportunity for countries with relevant experience and existing practices to ensure that new regional systems and solutions will be harmonized and interoperable with what they have already achieved on a bilateral and/or subregional basis. For less advanced parties, such direct participation may be expected to increase national capacity and the possibility of becoming early adopter/implementer;
- Compliance with commitments the party may have made in its bilateral and plurilateral regional trade agreements (RTAs) to collaborate on exchanging electronic data and documents (typically features in "Paperless Trading" Articles in RTAs, or related provisions)⁶; and
- Ultimately: (i) reduced trade transaction time and costs, potentially boosting trade competitiveness; (ii) improved levels of compliance by traders to regulatory requirements in international trade; and

(iii) more direct engagement of small and medium-size enterprise (SMEs) in international trade and cross-border e-commerce.

It is notable that the FA-CPT in no way makes electronic data exchange mandatory among Parties. States which sign the FA-CPT will, however, have some obligations. For example, they are expected to actively participate in the institutional arrangement under the Agreement (e.g., the Paperless Trade Council and Standing Committee once a year), and to participate in the development and implementation of collective and individual actions towards paperless trade, based on their available resources and capacities. Importantly, there is no technical or legal pre-requisite to becoming a party of the Framework Agreement, as assessments of legal and technical gap will be done by the Parties as part of their implementation of the Framework.

Builder of trust

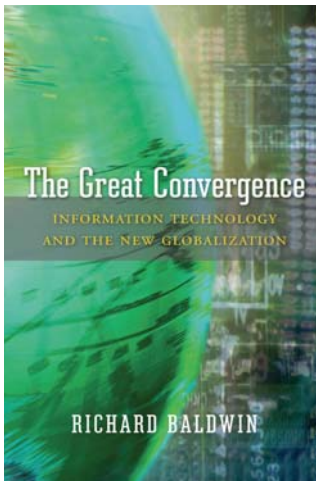
Cross-border paperless trade could be a source of great trade gains. It has the potential to make trade not only more transparent, but also more inclusive. Paperless trade is at the cross-road between trade facilitation and e-commerce. It enables Government to Government (GtoG) and Government to Business (GtoB) information and documents exchange without which cross-border e-commerce will not flourish. Its absence greatly limits SMEs' ability to directly engage in trade with customers outside their country. Implementation of the FA-CPT would address any lack of intergovernmental coordination mechanism to support adoption of common international standards, harmonize legal frameworks and gradually fill the capacity gaps. This builds understanding and trust among countries so that all trade stakeholders can effectively exchange data across borders in a reliable and safe environment. Five ESCAP Member States first need to ratify the FA-CPT before it comes into force. Which five countries in Asia will take up the role of championing the

region in this important area is yet to be seen. ■

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Notes

- ¹ United Nations ESCAP. 2016. "Resolution adopted by the Economic and Social Commission for Asia and the Pacific 72/4". *Framework Agreement on Facilitation of Cross-border Paperless Trade in Asia and the Pacific*. Bangkok: United Nations Economic and Social Council for Asia and Pacific. http://www.un.org/ga/search/view_doc.asp?symbol=E/ESCAP/RES/72/4&Lang=E
- ² ADB and United Nations ESCAP. 2017. *Trade Facilitation for a More Inclusive and Connected Asia and Pacific Region: Progress and Way Forward*. Mandaluyong City: Asian Development Bank. <https://www.adb.org/publications/trade-facilitation-inclusive-connected-asia-pacific-way-forward>
- ³ a. United Nations ESCAP. 2010. *Case of Korea's National Paperless Trade Platform – uTradeHub*. UNNExT Brief No. 3. Bangkok: United Nations Economic and Social Commission for Asia and the Pacific.
b. United Nations ESCAP. 2010. *Best Practice Cases in Single Window Implementation: Case of Singapore's TradeNet*. UNNExT Brief No. 2. Bangkok: United Nations Economic and Social Commission for Asia and the Pacific.
- ⁴ Joint United Nations Regional Commissions. 2017. *Trade Facilitation and Paperless Trade Implementation Survey 2017: Global Report* (unpublished). Bangkok: United Nations Economic and Social Commission for Asia and the Pacific.
- ⁵ Shepherd, Ben and Yann Duval. 2015. "Estimating the Benefits of Cross-Border Paperless Trade". In *Reducing Trade Costs in Asia and the Pacific*. Bangkok: United Nations Economic and Social Commission for Asia and the Pacific.
- ⁶ Duval, Yann and Kong Mengjing. 2017. *Digital Trade Facilitation: Paperless Trade in Regional Trade Agreements*. ADBI Working Paper No 747. <https://www.adb.org/sites/default/files/publication/321851/adbi-wp747.pdf>



Third wave of globalization

Title: The Great Convergence

Author: Richard Baldwin

Publisher: Harvard University Press

ISBN: 9780674660489

Neelu Thapa

“WHEN you fight tomorrow’s battles with yesterday’s weapons, you lose. We deserve better thinking about the New Globalization.”

The above quote by the author roughly sums up the central thesis of Richard Baldwin’s “The Great Convergence”. Amidst the growing opposition to globalization in the West, Baldwin provides a detailed insight in the process and the way it has evolved over the years. The book delves into how the ‘new globalization’ has divided the countries, and the people within, into low- and high-tech workforces, leading to the most contentious topic of modern times: inequality.

Globalization is inevitable, he explains, and there is no looking back on it. Explaining the present and future scenarios of globalization, Baldwin first depicts the past in detail to set the tone for the future picture. He gives an overview of the emergence of globalization in four phases covering different areas: archaeology, anthropology, climate science and political science. This, in totality, gives us a summary of where we are and how we got there—through the black plague, the advent of the shipping industry and the pervasiveness of modern information and communication technology (ICT). He identifies three major elements of globalization consisting of movement of goods, movement of ideas and, ultimately, movement of people, which is inescapable and may change the entire face of globalization.

Baldwin has emphasized on developing a sharp distinction among

the cost of moving goods, the cost of moving ideas and the cost of moving people to actually understand the evolving nature of globalization. Earlier, during the agricultural revolution, people were confined to one space as the costs of moving goods, ideas and people were expensive. These costs limited the separation of production and consumption.

The globalization that began in the 1820s, made possible by a flourishing shipping industry, was merely of goods manufactured in one country and traded in other countries. Less trade barriers, better technology and low cost of transportation reduced the spatial differences between production and consumption. Still, because of high communication costs, the industries remained confined to a few countries creating the “great divergence”. But, in the late 20th century, the information technology (IT) revolution resulted in the second globalization, the movement of ideas. He also refers to this as an unbundling, allowing production processes to be distributed throughout the world.

The book gives much emphasis to the ‘global value chain’, which, he says, has redefined the concept of national borders compelling us to rethink globalization. The global value chain has put many developing countries in an advantageous position in terms of efficiency and cost and IT has resulted in participation.

After the IT revolution of the late 1900s, the wealth share of developed nations in global income has plummet-

ed as the manufacturing hubs such as China, India, Indonesia, South Korea, Poland, among others, have increased their share. ICT has enabled transfer of rich-country technologies to low-wage countries. This has helped lift swathes of poor people in these countries. But, Baldwin points out that the benefits are limited to large multinational firms in a select few countries.

His third unbundling takes place when workers in one nation provide services in another nation, including the ones that require physical presence today. This means that labour services are being physically unbundled from labourers and it is going to change the entire course of globalization, again. This unbundling has shifted the jobs of low-skilled factory workers to developing countries for lower wages. However, the process hardly transfers the high wage-earning skilled jobs. This, he warns, is going to be the most difficult form of globalization as it is inevitable to bring the world to a point of “great convergence”. It is this form of globalization that has left poor factory labourers in the developed countries jobless and increased inequality, creating a loud opposition to globalization.

Instead of fighting to preserve the old order, Baldwin says countries need to equip themselves well by adapting to this great shift by changing their policies and tariff structure to suit the new dynamics. ■

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LDC Services Waiver

The LDC Services Waiver is a special privilege given to WTO's LDC members by their developed and developing counterparts.

Abyaya Neopane

Globalization, liberalization, deregulation, low cost of travel and easy communication have changed the way countries trade internationally. This has particularly encouraged trade in services that accounted for more than 17 per cent¹ of total trade worldwide in 2016. Services generate more than two-thirds of GDP, attract over three-quarters of Foreign Direct Investment (FDI) in advanced economies, employ the most workers and create novel jobs globally.² However, this surge in services trade largely occurred in developed economies. It has been argued that low productive capacity of developing economies, to absorb the wave of globalization and benefit from the communication and information technology, is a hindrance to their increased participation in international trade in services.

Barriers that restrict

There are barriers faced by the service providers in least-developed countries (LDC), which restrict them from easy access to developed markets. These restrictions notably come in the form of visa policies and non-recognition of qualifications. Movement of a person from an LDC to developed countries, which is one of the modes of services trade under the World Trade Organization (WTO), is the most restricted of all.

The developed members of the WTO have recognized the need to provide special treatment to LDCs to support them in meeting their trade and development objectives and participate more in the global services trade. This recognition gave birth to the LDC Waiver. The LDC Services

Waiver is a special privilege given to WTO's LDC members by their developed and developing counterparts. They follow WTO's most-favoured nation (MFN) principle while trading in services with them. The Waiver is equivalent to the 'enabling clause' of the General Agreement in Tariff and Trade (GATT), which was adopted to allow members to provide trading preferences to developing and LDC members. Such preferences would have otherwise violated the GATT.

The General Agreement on Trade in Services (GATS), under the auspices of the newly named WTO, came into effect in 1995.

The agreement is divided into six parts—scope and definition; general obligation and disciplines; specific commitments; progressive liberalization; institutional provisions; and final provisions. The principles of MFN³, Market Access⁴ and National Treatment⁵, among others, were also defined in the Agreement. It also laid out the four Modes of Trade in Services (See box).

GATS does not have any specific provision to positively discriminate LDCs in market access, except for some limited windows under MFN exceptions. It does, however, have Article IV that encourages members to increase the participation of developing members in services trade. The modalities and instruments for trade are in the form of access to technology, strengthening domestic services capacity, efficiency and competitiveness; improvement in access to distribution channels and information networks; and liberalization of market access that is of interest to the LDCs. In

addition to this, GATS also mandated members to establish a contact point to facilitate developing countries regarding issues relating to commercial and technical aspects of services supply; registration, recognition and obtaining of professional qualifications; and the availability of services technology.

It took years of negotiations between the developed and developing members to decide the modalities of Article IV implementation. Finally, in 2011, the Eighth Ministerial Conference of the WTO approved the Services Waiver Decision to allow members to deviate from the MFN principle to give preferential treatment while trading with LDCs. In 2013, the Ninth Ministerial Conference operationalized the Services Waiver. It also decided that the waiver would remain in place for 15 years from the date of adoption.

The LDC Waiver came in two forms—direct market access and non-market access. Direct market access meant that the countries could give exclusive market access to the modes of supply from LDC services suppliers. For example, a developed country, say A, in principle, could allow midwives from the LDCs to enter and work in that country and, at the same time, not offer this Mode 4 concession to any other non-LDC members. Similarly, country A could allow Mode 3 services providers from LDCs to just have a 10 per cent local hire requirement, while mandating non-LDCs to have 30 per cent requirement. Furthermore, country A could waive certain documents while applying for restaurant and hotel licenses.

The non-market preference comes in the form of recognition of qualification, special privileges in the form of subsidies, concessions in registration fees, establishment of an “LDC Help Desk”, among others. This also includes capacity building and technical assistance for strengthening the services sector of the LDCs.

Any waiver that goes beyond Article XVI (Market Access) is subject to approval from Council for Trade in Services (CTS), while market access commitments mentioned in Article XVI entails automatic waiver.

In 2014, the LDC Group submitted a collective request to the CTS targeting barriers such as the burdensome application fees, delays and paperwork for visa, licenses and residence and work permits, among others. They had caused them severe income losses if the visa was not granted or when fees were not returned. Imposition of transit taxes and other fees on tourists travelling to LDCs, visa denials stamped on passports and other

measures that served to stigmatize suppliers from an LDC were other difficulties. These were incorporated in the collective request. In addition, the difficulty in recognition of LDC educational institutions, degrees, diplomas and professional skills was another concern stated in the document.

As of June 2017, 25 members had already submitted their waiver notifications to the CTS. Switzerland, the European Union, India, China, Brazil, Korea, Iceland and New Zealand are some of the countries that have offered the broadest preference in terms of sectors as well as modes of services trade. For instance, India offered elimination of visa fees, a quota of 150 for tourist guides and export promotional initiatives, among others. It has been argued that 65 per cent of the requests made by the LDCs were fulfilled by the developed countries.⁶

The LDC Waiver is a non-reciprocal agreement, which means that an LDC does not have to give the same preference to its trading partner.

At the same time, the LDC Waiver is non-binding, which means that the developed countries offering the waiver can take it back whenever they please. The LDC Waiver is also non-obligatory, meaning that non-LDC members are not obligated to offer waiver. It can be argued that since members are not obliged to offer the waiver, everything depends on the political willingness of the developed countries and the ability of LDCs to negotiate.

Bound loose

Regarding implementation of the waiver, unlike goods, dissecting the country of origin of a particular service is not an easy task. The use of global value chains further complicates services tracking. Similarly, just as was seen with trade in Generalised Scheme of Preferences (GSP) goods, investors might establish shell companies in LDCs to benefit from the concessional treatment. While indicators such as jurisdictional person, local hire percentage and share of total business within the LDC are used in such cases, they are not free from ambiguity. ■

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Box

Four modes of trade in services

Mode 1: Cross-border

Services are delivered across border—from service provider of one country to the service consumer in another country. For instance, a software company in India providing software solutions to its client in the United States (US).

Mode 2: Consumption abroad

Service consumer of one country temporarily moves abroad to consume services provided in the foreign country. For example, a patient from China paying for a surgery at a hospital in the United Kingdom.

Mode 3: Commercial presence

Foreign services provider establishes an office, branch or any other type of professional/legal establishment in another country and provides services in that country. For instance, a foreign insurance company from the US opening its branch in Bangladesh by means of FDI.

Mode 4: Movement of natural persons

Service provider of one country moves to the country of service consumption to provide their labour services—skilled, semi-skilled and professional. For example, Nepali migrant workers providing construction services in Qatar.

Notes

- ¹ UNCTAD Statistics, 2016
- ² OECD. 2017. “Executive summary”, in *Services Trade Policies and the Global Economy*. Paris: OECD Publishing.
- ³ MFN forbids members from providing favourable treatment to one member and not to other members, while trading internationally.
- ⁴ Market access is a commitment by the member countries to allow access to foreign services providers in the home country. It could be limited through limitations on the value of transactions, service operations; or the number of employees or the number of service suppliers in the sector.
- ⁵ National Treatment mandates member countries to treat foreign services providers no less favourably than domestic services providers.
- ⁶ Drake-Brockman, J., A. Greenidge, J. Lan, and Q. Zhao. 2015. *Making the Most of the LDC Services Waiver*. Geneva: International Trade Center.

Bhutan for BBIN despite opposition

EXPERTS and government officials from the sub-region called for immediate implementation of the ambitious road connectivity plan involving Bangladesh, Bhutan, India and Nepal (BBIN) countries, during a two-day conference organized in Kolkata on 16 and 17 February.

The calls were made during a two-day BBIN conference organized by the India based think-tank Consumer Unity Trust Society (CUTS) International. Even as it remains uncertain whether or not Bhutanese Parliament will ratify a motor vehicle agreement involving these countries, participants agreed that the agreement should be implemented despite the challenges.

Implementation of the agreement has been delayed as Bhutan has not yet ratified it although it was inked



more than one and a half years ago in June 2015. India, Bangladesh and Nepal have ratified the agreement,

and are expected to go ahead with the plan by repackaging the agreement as BIN without Bhutan. ■

422 Pakistan schools go green

PAKISTAN will turn 422 public sector schools into 'Green Schools' through organized tree plantation, said Mr. Syed Zeeshan Ali Naqvi, Deputy Mayor, Islamabad.

The launch of the tree plantation drive was participated by a large number of students and people from different walks of life and organized by Pakistan Youth Climate Network (PYCN) and Sustainable Development Policy Institute (SDPI) in collaboration with the Federal Ministry of Climate Change on 9 February.

To mark the event at national level, SDPI in collaboration with PYCN and other stakeholders launched similar drives in Lahore, Karachi and Quetta. ■

'South Asia must move to intensify farming'

SPEAKERS at a regional workshop held in Kathmandu zeroed in on the agriculture sector's unprecedented challenges in South Asia against a backdrop of rising population, increasing malnutrition, overwhelming urbanization, global warming and adverse climate change.

The South Asian regional workshop was organized in Kathmandu on 23-24 March to validate the research findings of a report on sustainable intensification of agriculture (SIA) in the region. The research partners included South Asian Association for Regional Cooperation (SAARC) Secretariat, SAARC Technical Committee on Agricultural and Rural

Development (TCARD), SAARC Agricultural Centre, South Asia Watch on Trade, Economics and Environment (SAWTEE) and International Fund for Agricultural Development (IFAD).

During the programme, Mr. M.J.H. Javed, Director, Agriculture and Rural Development, SAARC Secretariat, pointed out that land supply in the region is almost exhausted and that a move away from input-intensive farming was called for.

Participants emphasized that the implementation of SIA would require a significant level of co-operation, fiscal coordination and trade policy harmonization at the regional level. ■

'South Asian water and energy cooperation needs rethink'

SOUTH Asia must review and reinforce regional energy and water cooperation in South Asia, according to experts.

During a discussion at a workshop held in Kathmandu on 15 February, they said that changing political, economic and ecological dynamics have necessitated reviewing of Nepal's water and energy policies.

The half-day media workshop 'Rethinking Water and Energy Cooperation' was organized by South Asia Watch on Trade, Economics and Environment (SAWTEE) in partnership with CUTS International and Institute for Social and Environmental Transition (ISET)-Nepal.

Mr. Ajaya Dixit from ISET-Nepal pointed out that the impact of climate change is already visible in Nepal's

water resources. Between 1977 and 2010 Nepal's icecaps have receded by 29 per cent, the springs in mid-hills have depleted and the rivers have deteriorated into sewerage channels, he said.

Since river conservation has mostly centred on the Himalayan Rivers, bilateral and multilateral platforms need to consider water sharing and management issues of rivers originating from the Mahabharata and Chure as well, he said.

Mr. Sher Singh Bhat, a power expert, pointed out that the major problem in Nepal's hydrological management lies in the lack of intra-sector and inter-sector coordination. As an example, he pointed out that licensing authorities grant clearances for projects without considering the

effect of upper stream projects on the lower stream and vice versa and also between usages.

As for power trading, Mr. Bhat said that with India's current power surplus situation and Nepal's deficit, we have become a lucrative market for India's electricity, not the other way around. Mr. Bhat's opinion was seconded by Mr. Kumar Pandey, the Vice President of Independent Power Producers' Association.

Dr. Posh Raj Pandey, Chairman of SAWTEE, pointed out that Nepal's inability to manage its water resources and energy potential has left it not only in power deficit situation but also with a large trade deficit. Increased dependency on India would translate into soaring payments deficit due to increased power purchase, he said. ■

Pakistan to intensify efforts on poverty alleviation

PAKISTAN will have to intensify and enhance its efforts on poverty alleviation to eradicate poverty in all its forms.

The view was expressed by a panel of senior economists during a 'Poverty as Functional Deprivation' seminar, held by Sustainable Development Policy Institute (SDPI) in Islamabad on 9 January.

They said that the need for dealing with multi-dimensional poverty was urgent in its nature and thus demanded multi-faceted strategy to bring about actual change at different levels. The next 15 to 20 years would be decisive for the economic future of Pakistan as this would be an era of a number of simultaneous opportunities and challenges, they said.

Dr. Rafi Amir-ud-Din presented a study, 'Poverty as Functional Deprivation', to highlight the Multi-dimensional Poverty Index (MPI) as new measure of poverty. He said that the Sustainable Development Goals (SDGs) have shown the understanding of the multifaceted nature of poverty by committing to "ending poverty in all its forms". However, he said, no consensus has been reached about the definition and measurement of poverty.

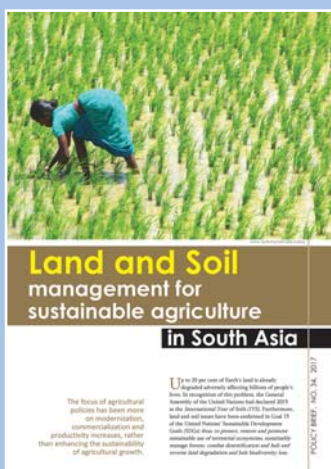
Likewise, he said that poverty in Pakistan was 55 per cent in the initial period, which came down by five percentage points to 50 per cent in a decade (2001-2010).

Dr. G.M Arif was of view that the government of Pakistan was trying to alleviate poverty by income support through Benazir Income Support Pro-

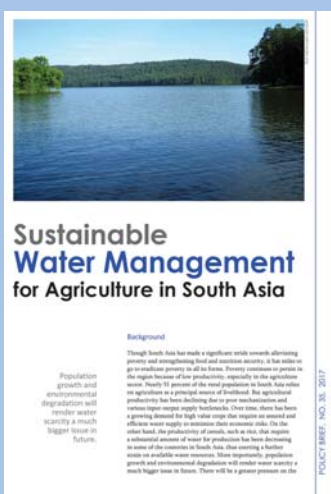
gramme (BISP). However, poverty has many dimensions and needs to be dealt through a multi-sectoral strategy. He said that the policy makers must include area wise vulnerability in their strategies.

He said that China Pakistan Economic Corridor (CPEC) and youth bulge was offering huge opportunities for Pakistan to include them into poverty alleviations plans.

Earlier, Dr. Sajid Amin, co-author of the study and head of Policy Solutions Lab SDPI, explained the importance of correct measurement of poverty for better and result oriented efforts. He said that reducing poverty in all its form was a major SDGs commitment of Pakistan than better execution of poverty alleviation strategies. ■



Policy Brief: Land and soil management for sustainable agriculture in South Asia
Author: Hari Dahal
Publisher: SAWTEE



Policy Brief: Sustainable water management for agriculture in South Asia
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South Asia Watch on Trade, Economics and Environment (SAWTEE) is a regional network that operates through its secretariat in Kathmandu and member institutions from five South Asian countries, namely Bangladesh, India, Nepal, Pakistan and Sri Lanka. The overall objective of SAWTEE is to build the capacity of concerned stakeholders in South Asia in the context of liberalization and globalization.

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