Discussion Paper

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Agricultural Input Trade and Food Security in South Asia

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Contents

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Abstract

Small landholdings in agriculture have been proven to be resource smart in using agricultural inputs efficiently. A comparative increase in farm productivity from majority of small farms reflects in the country trade also. This also affects the food security of the nation. This Discussion Paper tries to establish a link between the South Asian trade in agricultural inputs like cereal seeds, fertilisers, pesticides and machinery. An analysis of the trade deficit and surplus in the country reveals that other than the obvious trade of cereal seeds, India has an upper hand in trade of many agricultural inputs considered in this study. South Asian countries could also benefit from cross country and bilateral trade of machinery and fertilisers. A deeper introspection reveals that the Bangladesh, Bhutan, India Nepal (BBIN) group of nations might benefit on a larger scale of food security from intra-regional trading of agricultural inputs.

Introduction

The small landholdings of South Asian agriculture are much more in focus today than ever before. Smallholders can act as contraptions for a nation's growth and poverty reduction. Farming in Asia is predominantly subsistence based with the mean size of agricultural farms being 1.8 hectares in South East Asia and 1.4 hectares in South Asia (European Commission, 2015). There is plenty of evidence that poor smallholders are quite efficient in what they do. This view of 'poor but efficient' was powerfully promoted by T W Schultz, who famously stated, "(t) here are comparatively few inefficiencies in the allocation of factors of production in traditional agriculture" (Schultz, 1964). The recent emphasis on small farm holders can be explained by the phenomenon *inverse productivity relationship* i.e. in a number of countries smaller farms have higher crop yields than the larger ones. The farmers who had small landholdings are resource poor, but might be resource smart and hence use their inputs more efficiently. The end result is a comparative increase in farm productivity when compared to larger farms (Tscharntke, et al., 2012).

Providing smallholder farmers with access to quality agricultural inputs will empower them for growing a better future for their families and communities. Hence, it is significant to study how a country transacts in its agricultural input trade. The following discussion paper will observe the trends in the export and import market of some key agricultural inputs across South Asian Association of Regional Cooperation (SAARC) nations. The aim is to understand the status of agricultural input trade and its impact on food security in the SAARC region. The trends and comparisons across countries would help to understand the avenues for improvement for the developing countries.

SAARC Trends in Agricultural Inputs

Agricultural inputs are categorised into two types: consumable inputs, which have a short shelf life (like agrochemicals, seeds, diesel/oil, electricity, labour, etc.) and capital inputs which have a comparatively longer shelf life and are capital intensive (like land, agricultural

machinery, implements, credit etc.). In South Asian countries, many of these key inputs are locally produced and procured with due help from the private sector. But, export restrictions and trading bans isolate local markets and give small farmers little incentive to expand production for the next season, limiting the potential supply required to meet the national trade deficit or surplus. However, organisations like the fertiliser and seed associations in SAARC nations have started extending help to negotiate price subsidies and tariff rates for intra-regional trade in specific products. This has shown to actively promote self-sufficiency in food and agricultural production in the countries through proper use of fertiliser and other agricultural inputs and thereby improving the economic and social aspect for small holder farmers. Hence, agricultural input trade matters for food security everywhere. The succeeding discussions cover a selected few of inputs, namely cereal seeds[i], fertilisers[ii], pesticides[iii] and agro machinery[iv1].

Table 1: Total Trade Share of Agricultural Inputs to SAARC Countries during 2010-2014

Country share in SAARC import	Imported Value (%)			
	Cereal Seeds	Fertilisers	Pesticides	Agro-machinery
Afghanistan	1.06	0.12	0.04	0.95
Bangladesh	12.42	12.32	10.41	19.01
Bhutan	0.03	0.01	0.03	0.12
India	0.06	74.66	71.14	56.94
Maldives	0.03	0.01	0.13	0.04
Nepal	20.65	0.99	1.21	4.01
Pakistan	48.08	8.69	12.12	11.91
Sri Lanka	17.68	3.19	4.93	7.02
SAARC Import Share In the World	2.44	12.30	3.51	1.53
Total World Import (US$ Thousand)	31894070.00	374781892.00	154978886.00	155941066.00

Source: ITC Trade Map

The characteristics of smallholder farming in South Asia are evident in the total import trade share of agricultural inputs of SAARC countries from 2010 to 2014 (Table 1). Overall, the import share of the SAARC countries in the world trade of agricultural input is maximum in fertilisers with 12.30 percent and minimum in agro machinery with a nominal 1.53 percent. This trend can be explained by the possibility that smallholder farming demands high fertiliser inputs for maximising production from a restricted area and also less usage of

[1] The authors would like to thank ITC Trade Map for providing an exhaustive and updated list of trade data for free access in public domain.

machinery due to fragmented small farm sizes. Among the SAARC countries, India leads the import market share with more than 56 percent imports in all the inputs except cereal seeds. This establishes that, combined with the growing population demand, India has a substantial market for majority of the agricultural inputs. The data also shows that for cereal seeds, Pakistan has the largest import market share (48.08 percent) among the SAARC countries.

Comparing the import market share with the export market share for agricultural inputs yields interesting results. Table 2 shows the total export trade share of agricultural inputs of SAARC countries from 2010 to 2014. Overall, the export share of the SAARC countries in the world trade of agricultural input is maximum in pesticides with 5.61 percent and minimum in fertilisers with a nominal 0.13 percent. Among the SAARC countries, India leads the export market share with more than 82 percent exports in all the inputs considered in this study. The maximum exports in India have been observed in pesticides with 99.72 percent and minimum exports in fertilisers with 82.28 percent market share. Bangladesh seems to have close to five times less export market share in fertilisers with only 16.69 percent. Maldives has not recorded any export trade in any of the agricultural inputs considered for this paper. The rest of the countries recorded marginal export trade shares for all the agricultural inputs.

Table 2: Total Trade Share of Agricultural Inputs from SAARC Countries during 2010-2014

Country share in SAARC export	Exported Value (%)			
	Cereal Seeds	Fertilisers	Pesticides	Agro machinery
Afghanistan	0.02	0.01	0.00	0.0002
Bangladesh	0.12	16.69	0.004	0.09
Bhutan	0.00	0.00	0.00	0.00
India	87.34	82.28	99.72	98.15
Maldives	0.00	0.00	0.00	0.00
Nepal	0.01	0.04	0.01	0.02
Pakistan	12.40	0.19	0.23	1.66
Sri Lanka	0.12	0.80	0.05	0.08
SAARC Export Share In the World	2.13	0.13	5.61	0.34
Total World Export (US$ Thousand)	24572001.00	341428434.00	147549626.00	158389318.00

Source: ITC Trade Map

A comparison of the imported value and exported value of the share of the agricultural inputs among the SAARC countries shows remarkable trends. Overall, except pesticides, the SAARC share in the world agricultural input market is higher for the import market share *vis-a-vis* the export market shares. It is worthwhile to notice that among the countries, India

seems to show consistent trends when the import and export shares are compared. The exported share of India in cereal seeds (87.34 percent), fertilisers (82.28 percent), pesticides (99.72 percent) and agro machinery (98.15 percent) is higher that the imported share of cereal seeds (0.06 percent), fertilisers (74.66 percent), pesticides (71.14 percent) and agro machinery (56.94 percent). In addition, the imports share of cereal seeds is significantly lower as compared to the export share. This indicates that India can act as the trade equaliser in promoting trade among SAARC nations.

Table 3 and 4 show the list of top 10 countries importing and exporting agricultural inputs out of the SAARC nations. The data shows that most of the SAARC nations like Nepal, Bangladesh, Pakistan, Afghanistan and Sri Lanka are already importing agricultural inputs from within SAARC countries. Out of this, majority of the countries – Nepal, Bangladesh, Pakistan and Afghanistan are importing cereal seeds from SAARC countries. This indicates that, South Asian countries can directly ensure food security by facilitating policies and regulations for easier transfer of cereal seeds. Also, India and Pakistan are already exporting a key input – cereal seeds, to the SAARC nations to meet the domestic demand. In addition to this, India has also been exporting pesticides (6.68 percent) and machinery (8.27 percent) to the SAARC countries. This is a possible scenario where the South Asian countries can cooperate to ensure economic and social sustainability in the food security aspect.

Table 3: List of Top 10 Importers (value in %) of Agricultural Inputs from SAARC during 2010-2014

Cereal Seeds		Fertilisers		Pesticides		Machinery	
Nepal	24.58	Mozambique	16.82	USA	15.17	*Bangladesh*	12.86
Bangladesh	10.97	*Nepal*	12.69	Brazil	14.09	Nigeria	10.51
Philippines	7.27	Malaysia	10.71	France	4.41	*Nepal*	8.85
Viet Nam	6.51	Viet Nam	8.32	Netherlands	3.44	*Sri Lanka*	5.69
Indonesia	5.12	*Sri Lanka*	6.50	China	3.26	*Pakistan*	3.93
Pakistan	4.61	Thailand	5.47	Germany	3.17	USA	3.75
Afghanistan	4.22	Brazil	4.02	Japan	3.11	Kenya	3.00
Yemen	3.57	UAE	3.98	Belgium	3.00	Malawi	2.62
Malaysia	3.07	USA	2.88	United Kingdom	2.76	Germany	2.57
UAE	2.24	Tanzania	2.65	Vietnam	2.47	Myanmar	2.47
Total of Top 10 countries	72.17	**Total of Top 10 countries**	74.05	**Total Top 10 Countries**	54.89	**Total Top 10 countries**	56.24

Source: ITC Trade Map
**South Asian countries have been highlighted in Italics*

Table 4: List of Top 10 Exporters (value in %) of Agricultural Inputs to SAARC during 2010-2014

Cereal Seeds		Fertilisers		Pesticides		Machinery	
India	32.83	China	33.04	China	31.96	China	32.30
China	18.38	Russia	8.14	USA	18.50	Thailand	8.28
USA	17.64	USA	7.81	Germany	8.19	*India*	8.27
Thailand	7.94	Iran	5.56	Japan	6.76	USA	6.37
Pakistan	5.14	Saudi Arabia	5.19	*India*	6.68	UK	6.11
Russia	3.37	Oman	3.94	Switzerland	4.35	Italy	5.39
Chile	3.26	Jordan	3.85	Singapore	3.53	Germany	4.14
Italy	2.85	Morocco	3.67	Israel	3.02	Japan	3.26
Canada	2.12	Canada	3.15	UK	2.78	Taipei, Chinese	3.08
Philippines	1.13	Israel	2.97	France	2.72	Korea	2.66
Total of Top 10 countries	94.65	**Total of Top 10 countries**	77.31	**Total of Top 10 countries**	88.49	**Total Top 10 countries**	79.87

Source: ITC Trade Map
**South Asian countries have been highlighted in Italics*

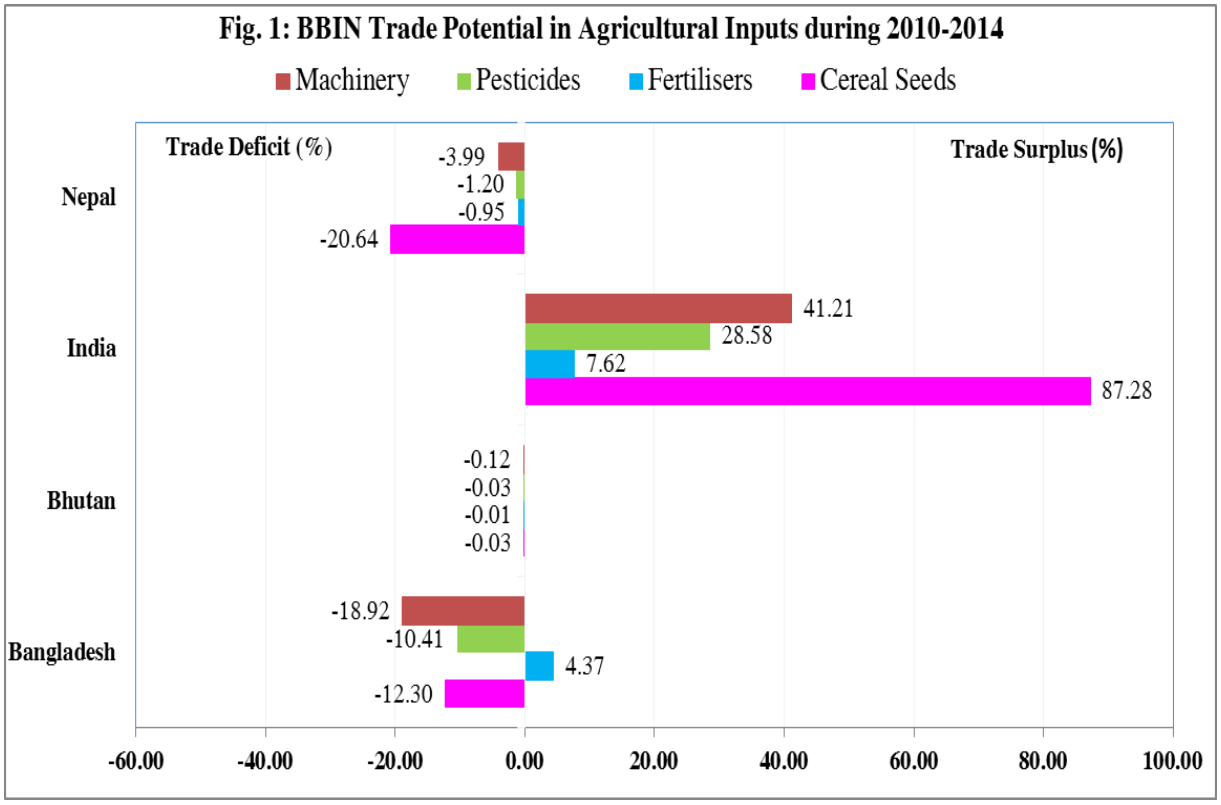
BBIN Trends in Agricultural Inputs

Relatively, the advancement and execution of regional collaboration within SAARC was lagging because of logistical and political reasons. The commercial balance of trade in monetary terms has been studied to extend the argument for trade surplus and deficit (Sullivan & Sheffrin, 2003) between the BBIN countries. This initiated an alternate approach model, which would address specific regional pockets, similar to the 'Southeast Asia Growth Triangle' model (Wadley & Parasati, 2000). A consensus was reached at the meeting of the SAARC Council of Ministers in New Delhi in May 1996, when they for the first time endorsed the idea of forming a growth triangle comprising the north eastern part of India, Bangladesh, Nepal and Bhutan (BBIN). Specifically, it would be termed as the South Asian Growth Quadrangle (SAGQ) (Dubey, Baral, & Sobhan, 2000). The all-inclusive initiative included six sectors viz. multimodal transport and communication, energy, trade and investment facilitation, tourism, optimum use of natural resource endowments and environment (Ahluwalia, 2015).

Certain recent change in policies like the Land Boundary Agreement (Modalities for Implementation of India – Bangladesh Land Boundary Agreement, 2015) and the Motor Vehicle Agreement (BBIN Motor Vehicles Agreement, 2015) have also shown to benefit BBIN by mutual cross border movement of passenger and goods for overall economic development of the regions[2]. Such indirect economic policies will promote agricultural trade also. For instance, the Memorandum of Understanding (MoU) between the National Seed Association of India and the Bangladesh Seeds Association (MoU, 2015) has helped in addressing need for cooperation to improve availability and accessibility to quality seeds[3] on a trans-boundary scenario. In view of these positive developments, a comparison of the trade potential in agricultural inputs for BBIN countries has been carried out in succeeding sections.

Figure 1 shows the trade deficit and trade surplus for the key agricultural inputs in BBIN countries from 2010-2014. The data seems to indicate that India has exhibited trade surplus for all the agricultural inputs. Along with India, Bangladesh has also shown a trade surplus of up to 4.37 percent in fertilisers. Nepal, Bangladesh and Bhutan have shown a significant trade deficit in cereal seeds to the tune of 20.64 percent, 12.30 percent and 0.03 percent respectively. These trends have significance in the emerging South Asian seed markets for India, since the population in these countries is predominantly cereal dependent for cheap and wholesome nutrition. Another key trend to be observed is that the highest trade deficit across all the three countries was observed in the agro machinery sector. The agro machinery market is also another field of emergence for India since the second largest trade surplus area for India is in agro machinery at a considerable 41.21 percent.

[2] Read more about CUTS CITEE's work on Motor Vehicle Agreement here - *http://www.cuts-citee.org/IBTA-II/*
[3] Read more about CUTS CITEE's work on Rice Seed Trade here - *http://www.cuts-citee.org/RISTE/*

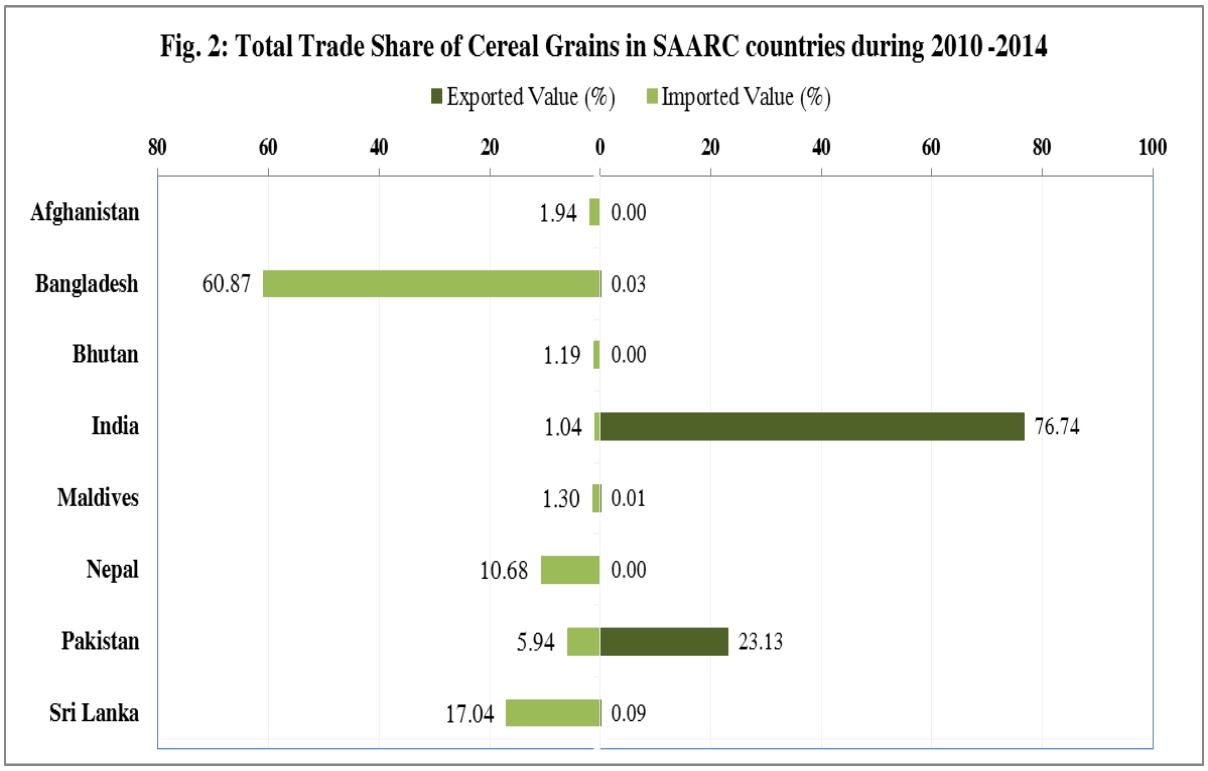


Linkages between Input Trade and Food Security

Ending poverty and hunger are the topmost targets under the new Sustainable Development Goals that will become functional from January 01, 2016. Yet today, 23 percent of the people who are routinely hungry live in the South Asia region. Malnutrition has been known to cause loss of close to 10 percent of lifetime earnings by an individual and eventually a loss of up to 3 percent of Gross Domestic Product (GDP) per year for a country (World Bank, 2015). A direct trade theory intervention to solve malnutrition and hunger in SAARC countries would be to initiate freer trade in agricultural inputs and specifically seed grains. However, this is easier said than done. Despite having informal and formal trade of food grains among the BBIN nations, the stance of South Asian governments is to immobilise the interdependent complementarities of trade. An appropriate example is the SAARC Food Security Bank, which has been in a dilapidated condition due to various reasons like delay in deciding various modalities and lack of political cohesion.

As mentioned in preceding sections, South Asian agriculture is constrained by the disparity in land issues and agricultural input trade. This has also bought an effect on the food security aspect also. The following sections will attempt to study the trends and analyse the relevant agricultural productivity and food production parameters and their impacts on the food production of the SAARC nations using parameters like cereal grains[v] trade, cereal yield[vi], food production index (FPI)[vii], crop production index (CPI)[viii] and agricultural value added[ix]. Figure 2 shows the total trade share of cereal grains in SAARC countries during 2010-2014. Consistent with the cereal seed data (Table 4), only India and Pakistan have considerable

value of trade value in the export market of cereal grains also, followed by negligible trade from Sri Lanka, Bangladesh and Maldives. On the contrary, all the SAARC nations have a visible trade value in the import market of cereal grains, with Bangladesh leading the way.

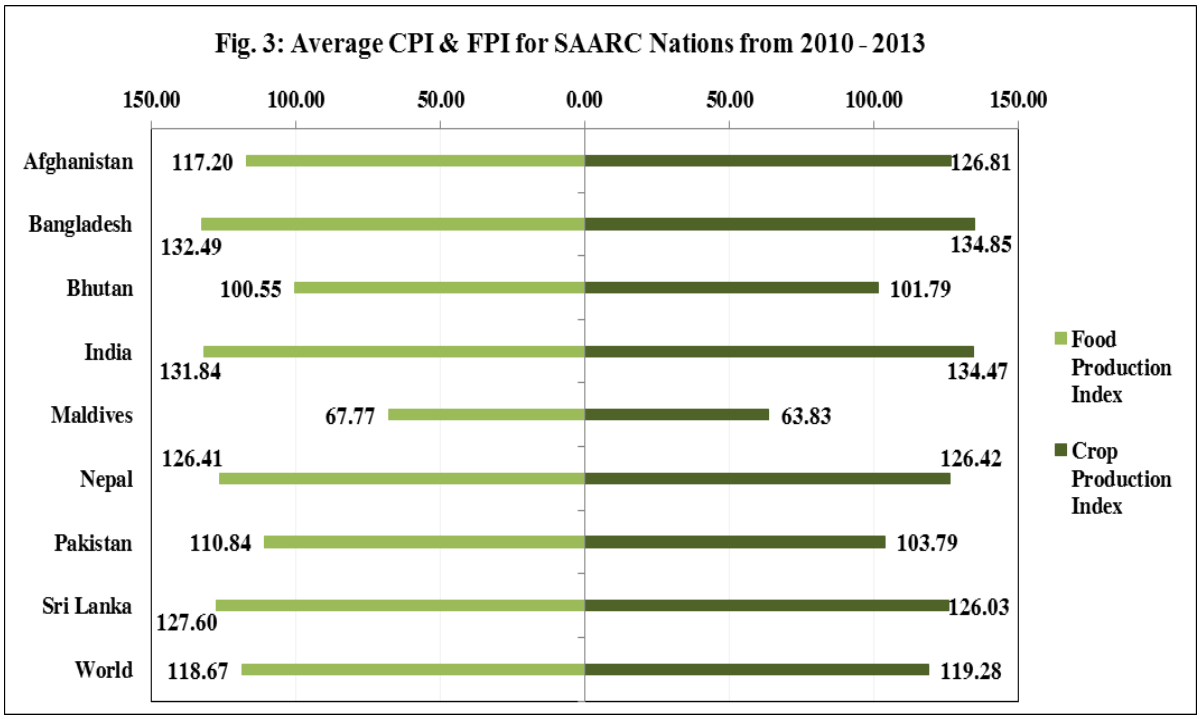


Similarly, during 2010-2013, the average cereal yield among SAARC nations was highest in Bangladesh, followed by Sri Lanka (Table 5). However India's cereal yield was almost half of what Bangladesh was able to attain. This indicates that despite importing high values of inputs, India still is not able to attain maximum potential in cereal output. This also supports the earlier argument of 'poor but efficient' fragmented farms of Bangladesh, which are more successful producers than the farms in India that are comparatively bigger in size.

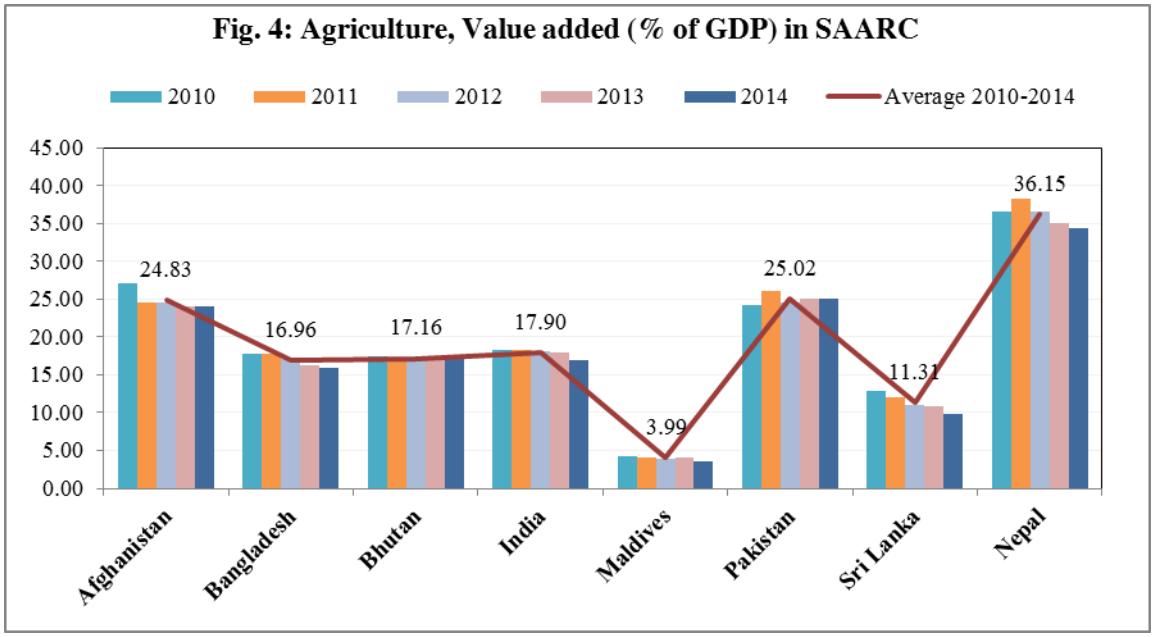
Table 5: Average Cereal Yield in SAARC Nations during 2010-2013

Country	Cereal yield (kg./ha.)
Bangladesh	4347.04
Sri Lanka	3792.75
India	2880.07
Bhutan	2789.14
Pakistan	2675.16
Nepal	2512.58
Maldives	2504.73
Afghanistan	1937.30
World	3681.48
Source: ITC Trade Map	

A positive trend can be seen in Bangladesh in terms of the food production index as well as the crop production index also. In terms of crop production index, Bangladesh (134.85) is closely followed by India (134.47), Afghanistan (126.81), Nepal (126.42) and Sri Lanka (126.03). The food production index of Bangladesh is also the highest at 132.49 followed by India (131.84), Sri Lanka (127.60) and Nepal (126.41). Comparing the Food Production Index (FPI) and Crop Production Index (CPI) among the countries, maximum countries have shown improved indices in crop production than food production. This indicates that even though the farms might be equipped to 'produce' more, but the crops are not being 'consumed' more because of multiple reasons. The questions that arise out of such comparisons range from – whether the crops produced are also relevant for daily consumption to do the crops being produced act as easier sources of ready cash rather than long-term nutrition for the family unit.



The final comparable output parameter in food security is the agriculture value added to the percent of GDP (Fig. 4). Nepal leads the SAARC nations with close to 36 percent of value added to GDP through agriculture. Nepal is followed by Pakistan (25.02 percent) and Afghanistan (24.83 percent). India occupies the 4th position with almost 18 percent of value added to percent of GDP by agriculture. The comparatively high contribution by Nepal is noticeable because of its low transaction status in agricultural inputs as well as outputs. This trend is also in agreement with the inverse productivity relationship where judicious use of minimal inputs and resources have managed to make sure that the agriculture still adds a considerable value to the percentage of the national GDP.



The food security metrics employed in many studies relate to availability and accessibility. So, improving food security in South Asia has to begin with the recognition that smaller farm households are both producers and consumers. They are also the most vulnerable to impacts of malnutrition and poverty. There are clear indications from the data discussed in this paper that South Asian nations have the capability for enhancing their agricultural input trade portfolio. To ensure that the smallholders are the reapers of the benefits, numerous policy discourse and trade facilitation practices need to be pondered upon at this scale.

Policy Impact and Discussions

Analysis shows that there are both potentialities and constraints for agricultural input trade in the SAARC region. India has always been at the forefront to promote cross-border movement of agricultural inputs and outputs. Further research is required to understand border issues for agricultural inputs and outputs. Family farms must be supported to innovate in ways that promote sustainable intensification of production and improvements in rural livelihoods. The overall objective must be to ensure equal opportunities between nations with different resource and financial endowments, and sustainable production including by effective small farm policies. In light of diverse and complex issues, following action points have been suggested for facilitating cross border trade in agricultural inputs and outputs in South Asia:

(i) India leads in both export as well as import of most of the agricultural inputs among the SAARC nations. India has also shown significant trade surplus in cereal seeds and machinery. Organisations like Asia and Pacific Seed Trade Association (ASPA) and respective National Seed Associations (NSA) can explore pathways for interactions in cereal seed markets. Public Private Partnership (PPP) models in agricultural machinery have shown success at National levels and can be scaled up to the geography of South

Asia. This could be a region of cooperation and trade from India to Bhutan, Nepal and Bangladesh, since they are closely connected by land.

(ii) To improve better physical movement of agricultural inputs, indirect interventions in supporting infrastructures should be initiated. Roadways, transit agreements, *haats* and customs processing at border checkpoints need to be self-sufficient to ease trans boundary trade of agricultural inputs and outputs. The Electronic Data Exchange (EDI) by India, which helped in implementing a Risk Management System, was a helpful initiative in this direction.

(iii) Along with formal trading of agricultural inputs and outputs, it is undeniable that the BBIN countries are hotspots for informal over-the-counter trading too, especially in cereal seeds. This suggests that traders have strong incentives in agricultural inputs even at the risk of higher transaction costs shows that food insecurity is still a concern across South Asia. Relevant policies addressing food security issues also need to feed from the Civil Society Organisation (CSO) advocacy voices in cross border trade.

(iv) South Asian countries can also grant subsidies to protect the small farmers by providing targeted subsidies rather than price subsidies for agricultural inputs. These subsidies can also be covered under a sunset provision or clause since unlimited subsidies quite often also hamper intra-regional trade in basic commodities like agricultural inputs. Promoting trade openness along with providing targeted subsidies to landless and poor farmers enables to expand the economy and achieve food security objectives.

(v) A key deterrent to facilitating input trade are the numerous regulations by individual nations which also prevents healthy competition. Enabling bodies like Bangladesh Fertiliser Association (BFA) and The Fertiliser Association of India (FAI) to cooperate and network is an immediate solution. This will generate interactions on key research problems and developing measures and steps toward open, free competitive marketing, trade and manufacture of all agro-inputs in South Asia.

Revolutionising the agricultural input supply system in South Asia (with focus on BBIN) requires a holistic approach that addresses among other issues, access, affordability, availability, and incentives. Since agriculture will long remain the main source of livelihood of roughly 70 percent of the rural population in BBIN, it is pertinent that a renewed interest in agricultural input trade should be the main vehicle of boosting food security and reducing poverty in these countries.

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Endnotes

[i] Includes HS nomenclature: 100111 - durum wheat seed for sowing, 100191 - seed of wheat and meslin, for sowing (excl. durum), 100210 - rye seed for sowing, 100310 - barley seed for sowing, 100410 - oats seed for sowing, 100510 - maize seed, 100610 - rice in the husk, 'paddy' or rough, 100710 – grain sorghum, for sowing, 100821 – millet seed for sowing (excl. grain sorghum) and 100830 – canary seed.

[ii] Includes HS nomenclature: 31 – fertilisers.

[iii] Includes HS nomenclature: 3808 - insecticides, rodenticides, fungicides, herbicides, anti-sprouting products and plant-growth regulators, disinfectants and similar products, put up for retail sale or as preparations or articles.

[iv] Includes HS nomenclature: 841931 – dryers for agricultural products, 842481 - agricultural or horticultural mechanical appliances, whether or not hand-operated, for projecting, dispersing or spraying liquids or powders, 8433 - harvesting or threshing machinery, incl. straw or fodder balers; grass or hay mowers; machines for cleaning, sorting or grading eggs, fruit or other agricultural produce; parts thereof (other than machines for cleaning, sorting or grading seed, grain or dried leguminous vegetables of heading 8437), 8436 – agricultural, horticultural, forestry, poultry-keeping or bee-keeping machinery, incl. germination plant fitted with mechanical or thermal equipment; poultry incubators and brooders; parts thereof, 8437 - machines for cleaning, sorting or grading seed, grain or dried leguminous vegetables; machinery used in the milling industry or for the working of cereals or dried leguminous vegetables (excl. farm-type machinery, heat treatment equipment, centrifugal dryers and air filters); parts thereof

[v] Includes HS nomenclature: 100630 - rice, semi-milled or wholly milled, whether or not polished or glazed, 100199 – wheat and meslin (excl. seed for sowing, and durum wheat), 100590 – maize (corn) nes, 100119 – durum wheat (excl. seed for sowing), 100640 – rice, broken, 100620 – rice, husked (brown), 100490 – oats (excl. seed for sowing), 100390 - barley (excl. seed for sowing), 100829 – millet (excl. grain sorghum, and seed for sowing), 100890 - cereals unmilled nes, 100810 - buckwheat, 100850 – quinoa 'chenopodium quinoa', 100790 - grain sorghum (excl. for sowing), 100290 - rye (excl. seed for sowing).

[vi] Cereal yield, measured as kgs per hectare of harvested land, includes wheat, rice, maize, barley, oats, rye, millet, sorghum, buckwheat, and mixed grains. Production data on cereals relate to crops harvested for dry grain only. Cereal crops harvested for hay or harvested green for food, feed, or silage and those used for grazing are excluded. The Food and Agriculture Organisation (FAO) allocates production data to the calendar year in which the bulk of the harvest took place. Most of a crop harvested near the end of a year will be used in the following year.

[vii] Food production index covers food crops that are considered edible and that contain nutrients. Coffee and tea are excluded because, although edible, they have no nutritive value.

[viii] Crop production index shows agricultural production for each year relative to the base period 2004-2006. It includes all crops except fodder crops. Regional and income group aggregates for the FAO's production

[ix] Agriculture corresponds to ISIC divisions 1-5 and includes forestry, hunting, and fishing, as well as cultivation of crops and livestock production. Value added is the net output of a sector after adding up all outputs