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Though the economy of the BIMSTEC members heavily depends on the agricultural sector, the intra-regional trade among them is below par because of several bottlenecks. One such bottleneck is the Sanitary and Phytosanitary (SPS) Measures adopted by the members of the BIMSTEC for agricultural products. This article investigates the agricultural trade patterns and the impact of SPS measures on BIMSTEC intra-trade. In a three-step analysis, we first do a demand and supply analysis for agricultural products at HS-6 digits using Michelaye's index. It shows that each member country has several high-potential commodities that can be traded with other member countries, but they are not. Second, we analyze the trends and patterns related to the SPS measures notified by the member countries to the WTO from 1st January 1996 to 31st May 2024. Several stylized facts have been illustrated. Finally, using these SPS statistics in a modified gravity model, we find that both the emergency and the regular SPS notifications significantly and negatively impact the agri-exports, and the former one are more harmful than the latter ones. The notifications, which end up as a trade dispute, hurt trade sentiments significantly. The notifications having objectives such as 'Animal health' and 'Food safety' are trade-distorting, while the notifications with multiple objectives containing objectives such as 'Plant protection' and 'Protect humans' are, in fact, trade-inducing.

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1 Introduction

International trade has been one of the finest engines of economic growth in any country. To reap the gains of the trade the countries form a regional bloc or free trade area wherein the trading partners of that bloc get some preferential treatment provided by the other bloc members in terms of tariff relaxations or otherwise. Today, almost every country is a part of one or more trading arrangements. India is a contracting party to several agreements comprising bilateral and regional agreements. Particularly, in its neighborhood, India has signed bilateral trade deals with Sri Lanka, Thailand, Nepal, and Bhutan, while India-ASEAN and SAFTA are regional trade arrangements. Apart from these, India is negotiating a preferential trade deal with its neighboring trade partner Bangladesh. Also, the BIMSTEC FTA is being negotiated by its member countries but these trade arrangements come with their own consequences in terms of gains or losses.

The distributional impacts of welfare for the trade participants are not uniform, and this is why they create suspicion for trade openness, due to which countries sometimes revert back to protectionism. Countries try to protect their nascent or non-competitive industries from the ensuing foreign competition by creating tariff or non-tariff barriers. When countries negotiate a regional trading bloc, they usually slash or remove the import tariffs for certain products, but sometimes, in order to protect their industries, they create non-tariff hurdles. These non-tariff measures create a dent to the trade flows. These non-tariff measures (NTM) include several practices like 'Sanitary and Phytosanitary measures', 'Technical barriers to trade', 'Pre-shipment inspection' etc. The UNCTAD Multi-Agency Support Team (MAST) details the classification of NTMs into three major categories- technical, non-technical, and export-related measures; and their further classification as shown in figure 1. Though all kind of NTMs and their impact is a question of inquiry but few of them become more important as either they are cited more frequently or they pertain to particular kind of commodities.

One such NTM is sanitary and phytosanitary (SPS) measures. SPS measures are usually applied to agricultural or food products but are not limited to them. SPS measures are the safety standards or regulations that are adopted by the countries to ensure the safety of food products. Not just the food products safety but also some other objectives or purpose are prevalent behind the adoption of SPS measures such as 'animal health', 'plant protection', 'protect territory from damage from pests', 'protect humans from animal/plant pest or disease'. Often, a combination of objectives is adopted to set a standard. Each country is generally determined to make sure that its citizens consume the good quality food items coming from outside and inside of the country, human health is protected from the disease, territory is protected from the pests etc. Hence, there is nothing wrong with the adoption of such regulations. The World Trade

Organization (WTO) also recognizes this right of adoption of such standards by each country.

During Uruguay round trade negotiations, a series of agreements were negotiated amongst the members, and one of them (the SPS Agreement) is related to the application of SPS measures that chalk out the basic rules on food safety, plant protection, human health, etc. This agreement allows WTO member-countries to adopt their own rules and regulations regarding the food safety, animal and plant health but these regulations or standards should be based on science, and not discriminate between the countries where similar conditions prevail. SPS agreement encourages the countries to follow the international standards or guidelines regarding any SPS measure but also allows to adopt a higher level of protection if there is any scientific justification behind it or if they are based on appropriate assessment of risks.

Imports	Technical measures	A SANITARY AND PHYTOSANITARY MEASURES
		B TECHNICAL BARRIERS TO TRADE
		C PRE-SHIPMENT INSPECTION AND OTHER FORMALITIES
	Non technical measures	D CONTINGENT TRADE-PROTECTIVE MEASURES
		E NON-AUTOMATIC LICENSING, QUOTAS, PROHIBITIONS AND QUANTITY-CONTROL MEASURES OTHER THAN FOR SPS OR TBT REASONS
		F PRICE-CONTROL MEASURES, INCLUDING ADDITIONAL TAXES AND CHARGES
		G FINANCE MEASURES
		H MEASURES AFFECTING COMPETITION
		I TRADE-RELATED INVESTMENT MEASURES
		J DISTRIBUTION RESTRICTIONS
		K RESTRICTIONS ON POST-SALES SERVICES
		L SUBSIDIES (EXCLUDING EXPORT SUBSIDIES UNDER P7)
		M GOVERNMENT PROCUREMENT RESTRICTIONS
		N INTELLECTUAL PROPERTY
		O RULES OF ORIGIN
	Exports	P EXPORT-RELATED MEASURES

Source: UNCTAD MAST Group

Figure 1: Classification of NTMs

While the criteria for setting such a standard is very much clear in principle but it is not so in practice. Sometimes, countries set an SPS standard that is random or arbitrary in nature or does not follow any international guidelines or standards. In such a situation, this becomes counter-productive to the trade flows. When a country sets a standard for any commodity, it is a general practice to communicate this measure to the WTO and its trading partners, and it also gives sufficient time to trading partners for comments on this measure. But sometimes, the countries notify a new measure and implement it within a very short span of time without giving sufficient time for comments by the trading partners. Again, this proves to be a very counter-productive practice against the trade flows. Such actions by notifying members may become a trade dispute as well.

Table 1 provides a short case study of how a SPS measure may become a trade-barrier. Some points are quite note-worthy here- first, this standard was adopted and implemented by the European Union (EU) even before notifying it; second, the affected parties were not provided sufficient time to submit their comments on it. This measure became a trade concern (or dispute) raised by India against the EU in SPS committee of WTO. The response of India in this context is very interesting one where it submits that

it was not provided enough time and the setting of maximum residue limit (MRL) for ethylene oxide is not based on scientific assessment, that's how it creates a trade-barrier. Not all the adopted measures or standards are detrimental to the trade sentiments; some are labelled as trade facilitating measures also where these kind of measures try to simplify the rules or set a good standards for any product without going to the extremities.

'Implementing Regulations on the increase of official controls and emergency measures, 2021' [1]	
Notifying member	European Union
Notifying Date	Jan 14 2022
Products Covered	Multiple products (Spices, Fruits, Veggies etc.)
Affected regions or countries	Multiple countries (Brazil, India, US etc.)
Measures	Increased level of official controls on entries of the commodity from India and others due to emergence of new risk to human health
Objective	Food Safety
International Standard?	None
Proposed date of adoption	Dec 15 2021
Proposed date of publication	Dec 17 2021
Proposed date of entry into force	Jan 06 2022
Final date for comments	Not Applicable
Trade dispute?	Yes
Response of India	*"MRL of 0.02 mg/kg for chili and ginger and 0.1 mg/kg for other spices fixed for ethylene oxide(EtO) lacked sufficient scientific basis. Given the possibility of natural occurrence of EtO, new MRL poses a trade-barrier. The regulation had been notified to the WTO eight days after entry into force, which did not allow time for comments."* – March and June, 2022 meetings

Source: WTO (Trade Concern database)

Table 1: Case study of a SPS measure

In this article, we will explore the impact of such SPS measures adopted by the countries in a regional bloc called BIMSTEC (Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation) against each other. BIMSTEC is a grouping of seven countries from south and south-east Asia named- Bangladesh (BGD), Bhutan (BTN), India (IND), Myanmar (MMR), Nepal (NPL), Sri Lanka (LKA), and Thailand (THA). BIMSTEC (originally BIST-EC) was founded in 1997. The subsequent sections will detail more about BIMSTEC. So, do SPS measures in BIMSTEC stymie the export flows or facilitate the same, and if so, what is their magnitude; this is the key question that we'll try to answer in this article. In the next section, the trading pattern and potential for trade in BIMSTEC will be explored. In the third section, some stylized facts regarding SPS measures in BIMSTEC will be explained.

[1] WTO notification no.: G/SPS/N/EU/538; Trade concern ID: 533

2 Literature review

When it comes to the impact of SPS on trade flows, there is an extensive literature which has established the relationship between the two. Due to the stringent SPS measure, an exporter may not gain access to a potential market. Crivelli and Gröschl (2016) has shown that due to SPS measures, the fixed cost of trading increases because it creates a higher barrier to market entry. While calculating the ad valorem equivalent (AVE) for SPS measures using the price-gap method for 65 countries, Cadot and Gourdon (2016) has estimated that the average AVE for SPS measures is around 3% but it is not uniform across the product categories. The most vulnerable category is animal products, for which AVE is 12.9% on average. Grant and Arita (2017) also establishes that the most affected category is animal products in case of a trade concern, while the overall agri-trade goes down by around 41%. Also, the impact of these measures are not uniform across the countries as well. Advanced countries generally adopt more stringent standards because of their advancement in resources and technology. For e.g., since developed countries have resources, they could adopt a low tolerance level for a particular chemical, but adherence to this limit for developing countries may be a troublesome task. Henson et al. (2000) has documented this as a fact that advanced countries usually apply more stringent SPS measures than developing countries and that SPS measures in many developing countries are weak and fragmented. Grant and Arita (2017) also corroborates the same that SPS measures affect developing countries more than developed ones. Within the developing countries, developing countries in Asia are more adversely affected by SPS measures, while non-Asian developing countries are more affected by TBT measures, as shown by Kang and Ramizo (2017). It may be more adverse for the least developed countries and even more for the landlocked least developed countries (LLDC). WTO (2021) study says that SPS measures adopted by importing countries could be difficult for LLDCs to meet as some of them are of technical and costly nature. In other words, the impact of SPS measures' severity escalates from an advanced country to LLDC meaning the advanced countries will be the least affected while LLDCs will be the most affected.

Literature also shows some ways to cope up with this trade anomaly. Disdier et al. (2019) and Stone and Casalini (2020) have shown that having a provision on SPS measures in an PTA would bring significant and positive effects on trade flows while having the legal enforceability of inter-regulatory co-operation mechanisms for SPS will have the strongest impact on trade flows. Cadot and Gourdon (2016) argues in the same way that signing an FTA will reduce the AVE for the animal products by 26.7% while the highest reduction will be in fats and oils category (45.4%). Another way of reducing the ill-effects of SPS measures is to increase the awareness level and knowledge dissemination. While doing an analysis for the black pepper value chain, Aarathi et al.

(2012) suggests that knowledge generation and food safety aspects dissemination are key for SPS standards. Henson et al. (2000) counts on the capability level of SPS measures in developing countries so that they can comply with the SPS requirements of advanced countries. Miljkovic (2005) goes on one step further where he argues that the consumers should be given proper information of SPS standards so that they can make a better informed decision about a product.

Kang and Ramizo (2017) comments that among Asian countries, SPS measures in particular are damaging intra-regional agricultural trade. De (2019) argues that tariffs are not a major trade barrier in BIMSTEC, but the non-tariff measures are thwarting trade growth. To the best of our knowledge, there is no study regarding the impact of SPS standards on trade flows in BIMSTEC. This study tries to fill this gap in the literature.

3 Data and methodology

In this article, the entire analysis is in three parts. In the first part, the pattern of intra-trade in BIMSTEC and the regional orientation of BIMSTEC member countries towards the region will be examined and after that the potential for trade in agricultural commodities will be explored. In the second part, a detailed analysis of the WTO notifications of SPS measures notified by BIMSTEC members will be taken up. In the third part, we'll do the gravity analysis for BIMSTEC agricultural trade using SPS information collated from the second part of the analysis.

For the first part of the analysis in section 4, data for the net export and import has been taken from UNCOMTRADE for the year 2012-19 at different levels of HS codes. Using this data, we calculate the regional orientation (RO) of member countries of BIMSTEC towards it. It measures the degree of intra-regional trade for a particular country-commodity pair with that of extra-regional trade. Specifically, it tells us whether the export (or import) of any good from any country to any region is greater than the export (or import) of the same good from the same country to some other region. RO is the ratio of two shares. The following formula has been used to quantify this.

$$RO_{is}^{X} = log\left(\frac{\Sigma_r X_{isr}/\Sigma_r X_{sr}}{\Sigma_w X_{isw}/\Sigma_r X_{sw}}\right)$$

where s is the source country, r is the set of countries in the region (BIMSTEC, in this case), w is the set of all countries not in the region, i is the particular commodity and X is the export value. For import orientation RO^M, export values have been replaced with the import values for that particular country-commodity pair. The values of both RO^X and RO^M will range from $-\infty$ to $+\infty$. A positive value for any commodity will signify

that the originating country is more oriented towards the region for that particular commodity and vice-versa.

Next, we calculate the Michelaye statistic (or index) which tell us the comparative advantage in any particular sector of an economy. For a particular commodity, the Michelaye index (MI) compares the export pattern of a country with the import pattern of same country. Whereas the RO is defined as the ratio of the two shares, MI is defined as the difference of the two shares. The difference between the share of a country's total export of any commodity in the aggregate export and the share of the same country's total import of the same commodity in the aggregate import is known as the MI; for which the following formula has been used.

$$MI_{is} = \frac{\Sigma_w X_{isw}}{\Sigma_w X_{sw}} - \frac{\Sigma_w M_{iws}}{\Sigma_w M_{ws}}$$

where s is the source country, i is any particular commodity for which comparative advantage is being calculated, w is the world, X is the export value while M is the import value. This index takes a value from -1 to $+1$ and for any commodity, a positive value will signify a revealed comparative advantage.

In the second part of the analysis in section 5, we've done a thorough study of WTO notifications related to SPS measures in BIMSTEC. For this purpose, we've used the 'SPS and TBT Platform' of WTO. This database contains all the notified documents related to Sanitary and Phytosanitary (SPS) and Technical barrier to Trade (TBT) measures adopted by any country. For this analysis, all SPS measures notified to WTO from 1^{st} January 1996 to 31^{st} May 2024 have been used. Only regular and emergency notifications have been considered here. So, in this way, we have 1150 regular or emergency WTO notifications for BIMSTEC member countries except Bhutan as Bhutan's data are not available. In the procured data, many entries under several heads are not available, for e.g., the HS code for several commodities are missing, or in same cases the objective behind issuance of the notification is not available. To obtain HS-6 digit code, HS code list has been used where the commodity has been matched with the HS-6 digit code using HS codes compilation prepared and maintained by the World Customs Organization. For objectives, the original notifications issued by the respective government were referred. After doing this, we get a complete dataset of SPS measures for BIMSTEC. In section 5, an analysis has been done to get some stylized facts from this dataset. This section provides the statistic related to the notifications for different dimensions, like the type of the notifications, the occurrences of HS codes in the notifications or the objectives used behind the issuance of such notifications etc.

In the final part of analysis in section 6, a gravity analysis has been done to know the impact of SPS measures on the export flows in BIMSTEC. For gravity analysis, the export data at the aggregate level has been taken from year 1996 to 2021 from the

UN COMTRADE database. We also use gravity dataset by CEPII. This dataset contains information for many gravity controls including the GDP of any country and distance, common language or contiguity etc. between any country-pair. Our main co-variate in the model is the number of WTO notifications which has been procured and collated from WTO database of SPS as mentioned earlier. Our augmented gravity equation which is the main estimation model is the following.

$$Ln(Exp_{ijt}) = \alpha_t + \beta_1 Ln(Y_{it}) + \beta_2 Ln(Y_{jt}) + \beta_3 Ln(dist_{ij}) + \beta_4 X_{ij} + \beta_5 X'_{ijt} + \beta_6 Notifications_{ijt} + \epsilon_{ijt}$$

where Exp_{ijt} is the export flow from the source country i to the destination country j in time period t. Y_{it} and Y_{jt} stand for GDP data for country i and j respectively in time period t. $dist_{ij}$ is the distance between any country pair. X_{ij} is the vector of time-invarying gravity controls in the equation which include contiguity, common language and social connectivity while X'_{ijt} stands for time-varying gravity controls between two countries which include diplomatic disagreement and free trade agreement. Here free trade agreement captures other trade related preferential treatment as well like partial scope agreement etc. ϵ_{ijt} is the error term in the model. $Notifications_{ijt}$ is the number of WTO notifications issued by any BIMSTEC member country against any other BIMSTEC member. $Notifications_{ijt}$ is further broken down into number of regular and emergency notifications. We also take the non-standard notifications, the notifications that became a WTO dispute (trade concern) and trade facilitating notifications. We also classify notifications objective-wise and use these numbers in this gravity model.

4 BIMSTEC: a snapshot of trading patterns

BIMSTEC, founded in June 1997 with the signing of the Bangkok declaration, is a regional bloc comprising seven countries, five from South Asia (Bangladesh, Bhutan, India, Nepal, and Sri Lanka) and two from Southeast Asia (Myanmar and Thailand). It was originally founded as BIST-EC (Bangladesh-India-Sri Lanka-Thailand Economic Co-operation) while Myanmar joined in December, 1997 and it became BIMST-EC. When Nepal and Bhutan joined this organization in July, 2004, it became what it is today-BIMSTEC (Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation). A major institutional milestone for regional integration was achieved when BIMSTEC got its secretariat in 2014. It is a sector-driven grouping where each country-member is entrusted with a particular sector's growth and cooperation, e.g.- Bangladesh has major focus on 'Trade, Investment and Development' while Myanmar does it for 'Agriculture and Food Security' etc.

BIMSTEC is a region that has many intriguing economic features. It houses around 23% of the world population yet contributes only around 4% to the world GDP and 3.8% in the world trade. Moreover, they share the land borders or geographical contiguity which is a trade-enabler. Except for Bhutan and Nepal, they have access to the ocean that provides them with maritime connectivity. This region is also full of natural resources like coal, metals and minerals. They also have fertile soil which makes this region as agri-independent region upto some extent. A vast population presents a high opportunity in terms of market. BIMSTEC connects South Asia with Southeast Asia, this may present another market opportunity for member countries. In other words, its strategic location may help in developing regional value chains.

Despite having so many favorable conditions, BIMSTEC's regional integration is very sluggish and well below its true potential. BIMSTEC's and its member countries' share in the world trade is also not very promising. Table 2 provides a detailed summary of each member's as well as BIMSTEC's share in world trade.

Many reasons may be counted behind this sluggishness, ranging from political instability, unemployment, over-dependence on agriculture, tariff and non-tariff barriers to low intra-trade levels and less regional orientation of its member countries to BIMSTEC.

		India	Sri Lanka	Nepal	Bangladesh	Myanmar	Thailand	BIMSTEC
Exports	Agriculture	43.2 (2.2%)	3.2 (0.1%)	0.5 (0.03%)	1.3 (0.1%)	5.1 (0.3%)	45.4 (2.4%)	98.8 (5.1%)
	Manufactures	233.9 (1.7%)	8.0 (0.1%)	0.5 (0.004%)	39.6 (0.3%)	6.7 (0.1%)	183.7 (1.4%)	472.5 (3.5%)
	Total Merchandise	345.6 (1.7%)	11.8 (0.1%)	1.1 (0.01%)	41.2 (0.2%)	16.2 (0.1%)	254.4 (1.3%)	671.0 (3.3%)
Imports	Agriculture	33.3 (1.7%)	2.9 (0.2%)	2.5 (0.1%)	12.5 (0.6%)	2.5 (0.1%)	19.7 (0.1%)	73.4 (3.7%)
	Manufactures	250.6 (1.8%)	12.6 (0.1%)	7.1 (0.1%)	42.1 (0.3%)	11.4 (0.1%)	164.4 (1.2%)	488.2 (3.6%)
	Total Merchandise	519.5 (2.5%)	19.7 (0.1%)	12.9 (0.1%)	65.6 (0.3%)	17.8 (0.1%)	247.0 (1.2%)	883.3 (4.3%)
Total Trade	Agriculture	76.5 (2.0%)	6.2 (0.2%)	3.0 (0.1%)	13.8 (0.4%)	7.7 (0.2%)	65.1 (1.6%)	172.2 (4.4%)
	Manufactures	484.6 (1.7%)	20.7 (0.1%)	7.6 (0.03%)	18.6 (0.3%)	18.1 (0.1%)	348.0 (1.3%)	960.7 (3.5%)
	Total Merchandise	865.1 (2.1%)	31.5 (0.1%)	13.5 (0.03%)	106.8 (0.3%)	34.1 (0.1%)	501.5 (1.2%)	1554.3 (3.8%)

Data Source: WTO Stats; Bhutan's data not available for this time-period.
Note: Authors' calculations; Numeral values are in billion USD averaged over 2017-22; In parentheses, percentage share has been shown. This table shows that the percentage share of India's agriculture export in world agriculture exports is around 2.2% while the total share of BIMSTEC in total world trade is around 3.81%.

Table 2: BIMSTEC and its members' share in world trade

If we look at the country profiles of agriculture sector only, a large work-force works in agri sector ranging from 40% to 60% in different countries of BIMSTEC to end up in contributing a meagre 10% to 20% to total GDP. Table 3 provides a picture of intra-trade in agriculture sector in BIMSTEC. The intra-trade in agricultural sector in BIMSTEC is also low barring Nepal. Much of the intra-BIMSTEC trade in agriculture is with India

and/or Thailand while direct trade among other BIMSTEC countries is negligible. For instance, Nepal's 92% exports are with BIMSTEC while it imports 56% of total imports value-wise from BIMSTEC, but in that too, Nepal's trade is heavily dependent on India. Its trade with other countries is negligible. Not just Nepal but other countries like Myanmar and Sri Lanka are also doing a good amount of trade with India. So, the main dominant player here is India which exports around 13% agri products to BIMSTEC and imports around 7.6% from BIMSTEC. India is one member here which is well-connected with other members through trade links.

The other big player is Thailand which has a great capacity in terms of agri products. Thailand, like India, is one of the top producer of the rice but its trade links with BIMSTEC are relatively weak. Thailand's exports and imports to BIMSTEC are only 5% to 6% of its total exports and imports. Except India and Myanmar, other member countries are not well connected with Thailand in terms of trade. Due to geographical contiguity, Myanmar shares a good portion of its trade with Thailand. Though Myanmar's share in BIMSTEC is fairly good, but apart from India and Thailand, Myanmar does not participate very much with other members in BIMSTEC. Sri Lanka, a small country has a good share in BIMSTEC intra-trade, it exports around 12% to BIMSTEC while imports about 30% but again apart from India, its trade connectedness with other members is not that much robust. One thing here should be noted that the geographical or maritime contiguity is playing a significant role in promoting trade between any two member countries that means if any two members are intensively engaged in trade, they may be neighboring countries.

		India	Bangladesh	Sri Lanka	Myanmar	Nepal	Thailand	BIMSTEC
India	**Export**		6.35	1.46	0.58	2.52	1.75	12.99
	Import		1.04	1.08	1.75	1.39	2.33	7.63
Sri lanka	**Export**	10.94	0.29		0.06	0.04	0.41	11.76
	Import	24.26	0.13		0.73	0.0003	4.64	29.76
Myanmar	**Export**	12.2	1.77	0.28		0.17	12.44	26.87
	Import	6.42	0.04	0.01		0.01	19.26	25.75
Nepal	**Export**	91.05	1.49	0.003	0.1		0.02	92.69
	Import	51.63	1.53	0.02	1.03		1.54	55.75
Thailand	**Export**	1.75	0.33	0.26	2.68	0.06		5.1
	Import	3.65	0.06	0.06	2.87	0.0003		6.64

Data Source: WITS COMTRADE; Data for Bangladesh and Bhutan not available for this time-period
Note: Authors' calculations; This tables shows that India exports 6.35% of total export value of agriculture to Bangladesh and 13% to BIMSTEC. Nepal is importing 0.02% of its total agri imports from Sri Lanka and from BIMSTEC, it is 55.75% value-wise.

Table 3: Agricultural Intra-trade matrix in BIMSTEC (in %)

One member country may be more connected towards the region in other commodity trade apart from the agriculture. Figure 2 and figure 3 show the regional orientation of member countries towards BIMSTEC for manufacturing and agriculture respectively.

These figures are in terms of exports only for three different time instances. Regional orientation here means that how much of the total trade is happening with BIMSTEC region only. If we see member countries' orientation in manufacturing sector, it presents a stark contrast relative to the agriculture sector. Bangladesh and Nepal which are quite connected to the region in the agriculture sector are not oriented in the manufacturing sector; infact Nepal is becoming less connected to the region in this particular sector. Myanmar's orientation has dwindled in the manufacturing sector. Sri Lanka's participation has been fluctuating. India's orientation is not significant enough in manufacturing. The only country which has been connected well in manufacturing is Thailand yet its orientation level is not very high.

In figure 3, apart from Bangladesh and Nepal, no member country has shown a consistent orientation towards the region. In fact, Nepal has increased its trade ties with the region in agriculture sector. Though it is less, Myanmar is also showing an uptick in trade connectedness with the region. Sri Lanka has been fluctuating in this sense. The two big players, India and Thailand are not contributing much here. India whose exports of agriculture were more channelized towards BIMSTEC than non-BIMSTEC in 2012 and 2015 has turned the other way around in 2019. While Thailand's agriculture exports to BIMSTEC are in negative zone that means they had never been proportionately high for BIMSETC in comparison to non-BIMSTEC. In simpler words, Thailand is not well connected to the region for agriculture commodities exports. In a nutshell, we can posit that BIMSTEC member countries are oriented to BIMSTEC more in agriculture than manufacturing.

Hence, it further becomes a matter of interest to know which are those agricultural commodities which are traded more among the member countries and which are traded less. Or, the regional orientation of agricultural commodities for each country will present us a more concrete and granular result. Figure 4 and figure 5 provide the trends for the regional orientation of agricultural commodities in each member country for the export and the import respectively. Three categories may be defined here in terms of orientation; strongly or consistently trade-oriented commodities in BIMSTEC, whereas other category might be labeled as less trade-oriented and lastly, a category may be called non-oriented commodities.

For Thailand, the strongly export-oriented commodities are 'Fat oils', 'Lac, gums and resins' and 'Oil seeds' while the same category for India include 'Live animals', 'Coffee, tea and spices', 'Plaiting Products' and 'Vegetables'. For Myanmar, except 'Vegetables' no other category is strongly exported to the region. Sri Lanka is strongly exposed to the region in certain commodity like 'Live animals','Fats and Oils' etc. Same way, Bangladesh is also has some consistently oriented commodities like 'Fats and oils', 'Milling Products' etc. Nepal has many strongly connected commodities, infact it has the most. At the same time, there are certain commodities where the countries are not well oriented

towards the region.

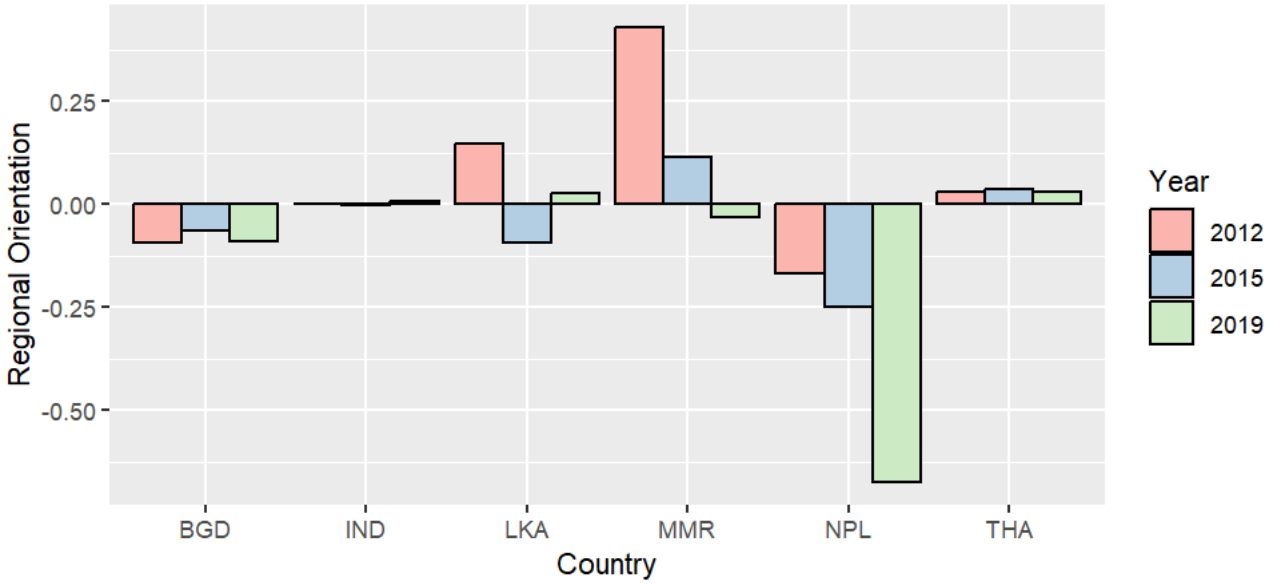

Figure 2: Regional orientation of manufacturing

Thailand's participation is very weak for certain commodities 'Animal products', 'Cereals' etc. India's non-oriented commodities are 'Fats and oils' and 'Fish' etc. Similarly for other countries but in case of Myanmar, there is a lot of scope to align its exports to the region. The category of less-oriented commodities for Sri Lanka include 'Fruits and nuts', 'Dairy' etc. 'Oil seeds' and 'Cereals' are some of the commodities for Nepal which are less oriented.

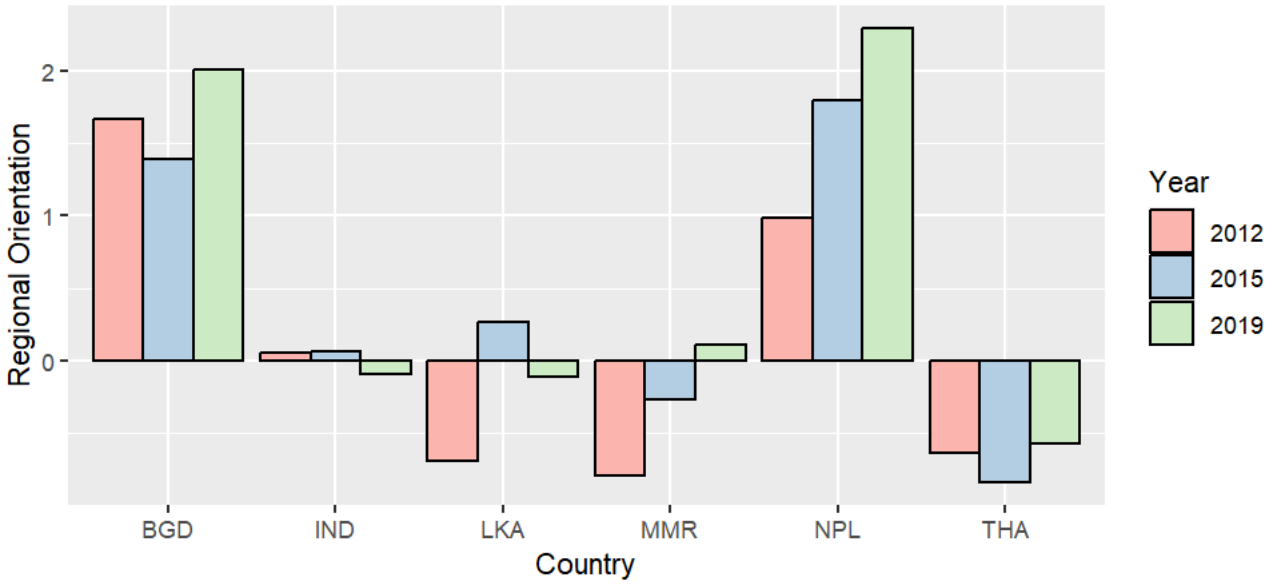

Figure 3: Regional orientation of agriculture

Figure 4: Export Orientation of BIMSTEC member countries towards BIMSTEC

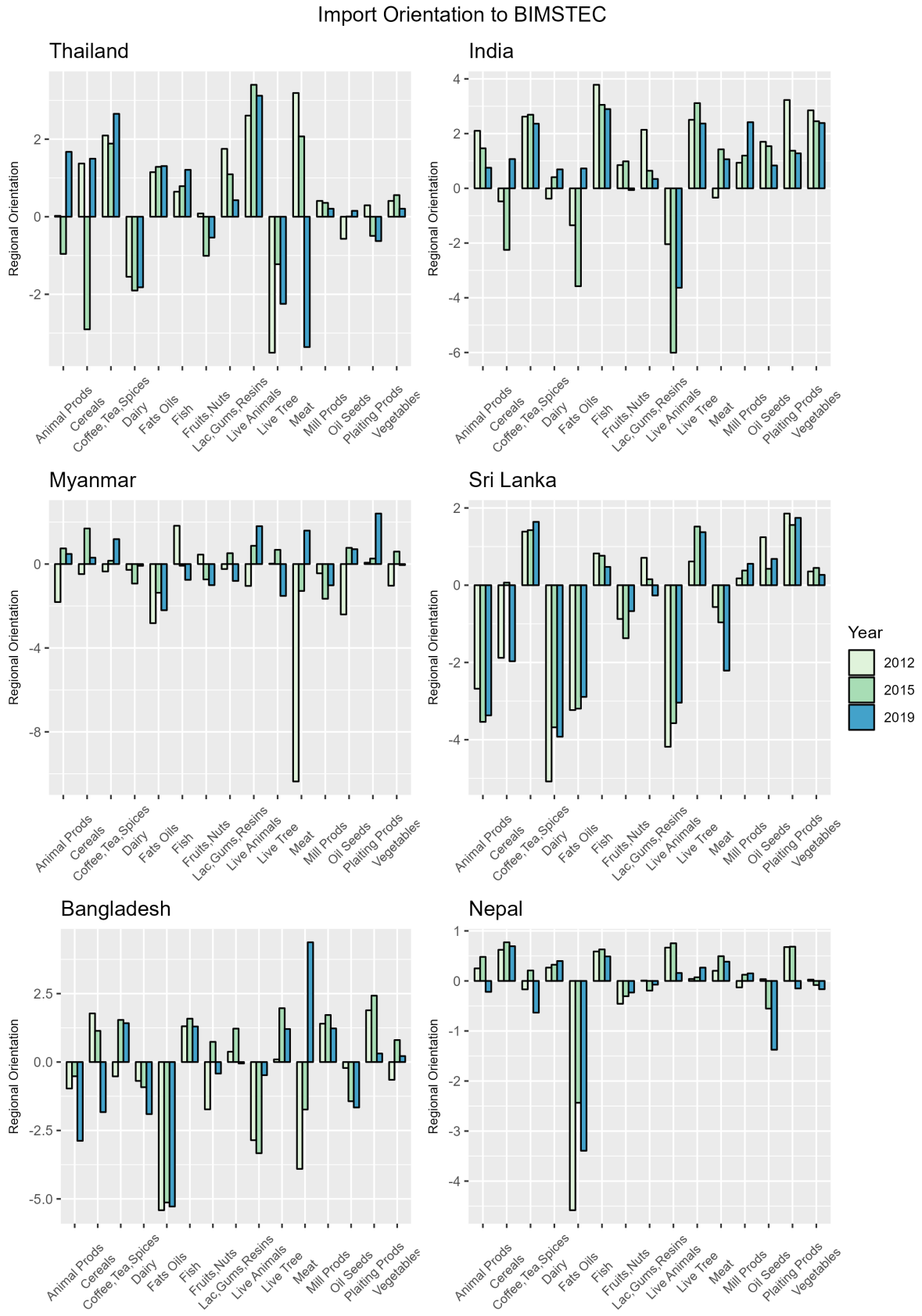

Figure 5: Import Orientation of BIMSTEC member countries towards BIMSTEC

If both export orientation and import orientation are analyzed together, it exhibits several patterns. There are several commodity-country pairs for which exports are oriented well but not imports, suggesting that commodity-country pair may have a capacity for exports. Such examples are 'Live animals-India', 'Animal products-Sri Lanka', 'Fats and oils-Nepal' etc. Another pattern is the opposite of the first one that is export orientation is negative while import orientation is positive. This pattern signifies that the particular country is importing more from BIMSTEC than exporting to it. Such instances are 'Vegetables-Thailand', 'Oil seeds-Sri Lanka' etc. A third pattern is where a country is neither exporting nor importing from BIMSTEC in case of some commodities. Such commodity-country pairs are 'Fats and oils-Myanmar' and 'Live tree-Thailand' etc. This signifies that such countries do not engage with BIMSTEC members in these commodities. The last pattern is where both export and import orientation is strong. 'Vegetables-India', 'Milling products-Sri Lanka' are such examples. Since these products are aggregated at HS-2 digits, so this is a possibility that at the more granular level (like HS-6), they might be different commodities. This warrants a further analysis at HS-6 digit to know which are those commodities which are being traded. Apart from this, it will be interesting to know the commodities which have a great potential to trade but not being traded within BIMSTEC. In the next subsection, we'll analyse this commodity pattern for BIMSTEC member countries.

4.1 Exploring the potential

In this subsection, the HS-6 digit commodities which have the highest potential to trade have been identified. For this identification of commodities, we calculate the Michelaye index at HS 6 digits for each country in BIMSTEC, as mentioned in the data and methodology section. Many commodities turn out to be potent products for a country, but we just take the top 10 commodities, which have the highest Michaleye statistic averaged over the time period of 2012-17. The Michelaye statistic has been presented in the appendix. Table 4 charts out the top 10 agricultural products for BIMSTEC which have a strong capacity to be traded. Each country has a different strong base of commodities, but some of them overlap among the countries, e.g.- 'Frozen shrimps and prawns (030613)' is a strong product of both India and Bangladesh.

Next, we will examine the commodities that have been imported from outside BIMSTEC by member countries, but these imported commodities are, in fact, potent commodities for one of the member countries in BIMSTEC. In other words, some commodities may be imported by a member country, but these are exported in huge quantities by other member countries only. This exercise has been done for three time periods, as mentioned in Table 5. For example, Bangladesh imports maize from outside BIMSTEC in 2019, but maize is one of the strong commodities of Myanmar. In the same way,

Nepal imported crude coconut oil in 2012 from outside BIMSTEC, while it is one of the potent commodities of Sri Lanka. One possibility that may be cited behind this trend is that the commodities that have been imported from outside BIMSTEC are large quantity imports while the available capacity in BIMSTEC may not be a match to that. As we know India is a big importer of Palm oil that mostly comes from outside BIMSTEC. According to Table 4, Palm oil and its fractions are in the potent product category, but Nepal is not a major producer of such a commodity in the world. Hence, a difference between high import demand and low export supply may also drive this trade pattern. This requires one more step of analysis where the margin between the demand and supply be in terms of import and export will be examined.

Table 6 shows the export capacity of BIMSTEC members for those commodities that were imported from outside BIMSTEC in 2019. The second column denotes the imported commodity from outside BIMSTEC, the third column indicates the value of an imported commodity or the import demand for that commodity, the fourth column tells about the export supply available with one of BIMSTEC's members, while the last one shows the total export supply in BIMSTEC for a particular commodity. These last three columns tell us the demand-supply pattern in terms of import-export in BIMSTEC. This demand-supply gap has been shown only for those commodities where the difference between them is significantly huge.

Let's take the example of Bangladesh; it imports 'Potatoes, fresh chilled' of worth of 1.8 thousand USD from outside BIMSTEC while India has export capacity of 76 million USD alone and the entire BIMSTEC has 76.5 million USD. One point noteworthy here is that both these countries share land border and maritime connectivity. In another instance, Myanmar imports very little amount of 'Other salted or smoked meat' of value 0.1 thousand USD. Thailand has a very high export capacity for this commodity of around 185 million USD. Again, both of these are contiguous countries.

As a remark, we may say that BIMSTEC has a lot of scope and potential in agricultural trade and integration but it is not reaping the gains of regional integration as it should be. Member countries' orientation towards the regions is also quite skewed. Nepal is intensively participating in the region while Thailand is least oriented in terms of intra-trade with BIMSTEC. Whereas Myanmar's commodity-wise orientation is weak and it imports a lot from non-BIMSTEC countries.

As mentioned earlier, there might be many factors behind this regional rift, including trade and non-trade related ones. Non-trade related factors may include diplomatic disagreement, political instability, weather related events etc. Trade related factors include tariff and non-tariff barriers and small economies etc. As mentioned earlier, one of the trade related factor is Sanitary and Phytosanitary (SPS) measures that may impact agricultural trade negatively.

Top-10 potent agri-products of BIMSTEC member countries	
Bangladesh	Frozen Shrimps and Prawns (030613), Vegetable and Mixture of Vegetables (071190), Other nuts, fresh or dried (080290), Parts of Plants without flowers or buds (060499), Frozen Fish (030379), Other Spices (091099), Vegetable Products (140490), Sesamum Seeds (120740), Potatoes, fresh or chilled (070190), Crabs (030624)
Bhutan	Oranges fresh or dried (080510), Cardamoms (090830), Potatoes, fresh or chilled (070190), Apples (080810), Plants used in perfume (121190), Other nuts, fresh or dried (080290), Ginger (091010), Potatoes frozen (071010), Nutmeg (090810), Mushroom fresh or chilled (070951)
India	Semi-milled or Wholly-milled rice (100630), Frozen boneless bovine meat (020230), Frozen Shrimps and Prawns (030613), Mucilages and thickeners of locust beans (130232), Cashew nuts (080132), Castor Oil and its frations (151530), Shelled groundnuts (120220), Fruits of genus capsicum (090420), Fermented Black tea (090240), Sesamum Seeds (120740)
Myanmar	Dried beans shelled (071331), Husked brown rice (100620), Sesamum Seeds (120740), Maize (100590), Fresh or chilled flat fish (030229), Oranges fresh or dried (080510), Fresh or chilled fish (030269), Broken rice (100640), Maize seed (100510)
Nepal	Palm Oil and its fractions (151190), Cardamoms (090830), Fermented Black tea (090240), Soyabean oil and its fractions (150790), Dried lentils (071340), Other nuts, fresh or dried (080290), Vegetable products (140490), Plants used in perfume (121190), Ginger (091010), Frozen boneless bovine meat (020230)
Sri Lanka	Other Fermented Black tea (090240), Fermented Black tea (090230), Cinnamon and Cinnamon tree flowers (090610), Coconut dessicated (080111), Dried pepper (090411), Frozen Tunas (030349), Crude Coconut oil (151311), Green tea in immediate packings (090210), Wheat or meslin flour (110100), Yellowfina Tunas fresh or chilled (030232)
Thailand	Semi-milled or Wholly-milled rice (100630), Manioc starch (110814), Other fresh fruits (081090), Manioc fresh or dried (071410), Frozen Shrimps and Prawns (030613), Meat and edible offal of fowls (020714), Broken rice (100640), Other dried fruits (081340), Guavas and Mangoes (080450), Other meat salted or smoked (021090)

Note: Authors' calculations. In parentheses, the HS-6 commodity code has been mentioned.

Table 4: Export potential of Agri-products in BIMSTEC

Products with export potential in BIMSTEC imported from non-BIMSTEC countries		
Country	**Year**	**Products**
Bangladesh	2012	Cinnamon and Cinnamon tree flowers (090610), Crude Coconut oil (151311), Soyabean oil and its fractions (150790), Potatoes, fresh or chilled (070190), Shelled ground-nuts (120220), Vegetable and Mixture of Vegetables (071190), Frozen boneless bovine meat (020230), Meat and edible offal of fowls (020714), Mushroom fresh or chilled (070951), Potatoes frozen (071010), Frozen Tunas (030349)
	2015	Palm Oil and its fractions (151190), Dried lentils (071340), Potatoes frozen (071010), Frozen boneless bovine meat (020230), Meat and edible offal of fowls (020714), Potatoes fresh or chilled (070190), Parts of Plants without flowers or buds (060499)
	2019	Maize (100590), Crude Coconut oil (151311), Potatoes frozen (071010), Potatoes fresh or chilled (070190),
Bhutan	2012	NA
	2015	Frozen boneless bovine meat (020230)
	2019	Frozen Shrimps and Prawns (030613), Frozen Tunas (030349)
India	2012	Sesamum Seeds (120740), Maize (100590), Manioc starch (110814), Castor Oil and its frations (151530), Potatoes frozen (071010), Soyabean oil and its fractions (150790), Fresh or chilled flat fish (030229), Frozen Tunas (030349), Mushroom fresh or chilled (070951), Crabs (030624)
	2015	Palm Oil and its fractions (151190), Sesamum Seeds (120740), Maize (100590), Crude Coconut oil (151311), Manioc starch (110814), Soyabean oil and its fractions (150790), Castor Oil and its frations (151530), Potatoes frozen (071010), Crabs (030624)
	2019	Dried lentils (071340), Sesamum Seeds (120740), Castor Oil and its frations (151530), Husked brown rice (100620), Broken rice (100640), Meat and edible offal of fowls (020714), Frozen Tunas (030349),
Myanmar	2012	Shelled ground-nuts (120220), Semi-milled or Wholly-milled rice (100630), Frozen boneless bovine meat (020230), Sesamum Seeds (120740), Fruits of genus capsicum (090420), Castor Oil and its frations (151530), Manioc fresh or dried (071410), Wheat or meslin flour (110100), Dried pepper (090411), Broken rice (100640), Cinnamon and Cinnamon tree flowers (090610), Potatoes frozen (071010), Fermented Black tea (090230), Manioc starch (110814), Potatoes fresh or chilled (070190), Vegetable and Mixture of Vegetables (071190)
	2015	Fermented Black tea (090230), Vegetable Products (140490), Frozen boneless bovine meat (020230), Cinnamon and Cinnamon tree flowers (090610), Potatoes frozen (071010), Mucilages and thickeners of locust beans (130232), Dried lentils (071340), Nutmeg (090810), Coconut dessicated (080111), Meat and edible offal of fowls (020714), Other Spices (091099)
	2019	Cardamoms (090830), Vegetable and Mixture of Vegetables (071190), Mucilages and thickeners of locust beans (130232), Frozen Tunas (030349), Coconut dessicated (080111), Manioc fresh or dried (071410), Other nuts fresh or dried (080290), Other meat salted or smoked (021090)
Nepal	2012	Crude Coconut oil (151311)
	2015	Other meat salted or smoked (021090)
	2019	Frozen Fish (030379)
Sri Lanka	2012	Oranges fresh or dried (080510), Soyabean oil and its fractions (150790), Frozen boneless bovine meat (020230), Potatoes frozen (071010), Husked brown rice (100620), Crabs (030624), Mushroom fresh or chilled (070951)
	2015	Apples (080810), Soyabean oil and its fractions (150790), Fresh or chilled flat fish (030229), Potatoes frozen (071010), Mushroom fresh or chilled (070951)
	2019	Palm Oil and its fractions (151190), Oranges fresh or dried (080510), Frozen boneless bovine meat (020230), Other nuts, fresh or dried (080290), Mushroom fresh or chilled (070951)
Thailand	2012	Apples (080810), Potatoes, fresh or chilled (070190), Yellowfina Tunas fresh or chilled (030232), Crude Coconut oil (151311), Potatoes frozen (071010), Soyabean oil and its fractions (150790)
	2015	Apples (080810), Palm Oil and its fractions (151190), Soyabean oil and its fractions (150790), Nutmeg (090810), Dried lentils (071340), Potatoes frozen (071010)
	2019	Apples (080810), Frozen boneless bovine meat (020230), Mushroom fresh or chilled (070951), Crude Coconut oil (151311), Vegetable and Mixture of Vegetables (071190), Palm Oil and its fractions (151190), Potatoes frozen (071010), Soyabean oil and its fractions (150790)

Note: Authors' calculations. In parentheses, the HS-6 commodity code has been mentioned.

Table 5: Imports from non-BIMSTEC countries

Imports from non-BIMSTEC and corresponding export capacity in BIMSTEC				
Importer	**Imported commodity (HS-6 code) from non-BIMSTEC**	**Imported commodity value (thousand USD)**	**BIMSTEC member with highest export capacity (thousand USD)**	**Total export capacity in entire BIMSTEC (thousand USD)**
Bangladesh	Crude Coconut Oil (151311)	2744	53718.5 (LKA)	56869.42
	Patatoes Frozen (071010)	1.86	720.8 (IND)	800.525
	Potatoes, fresh or chilled (070190)	1.81	76026.5 (IND)	76584.96
Bhutan	Frozen Shrimps and Prawns (030613)	2.9	4562737 (IND)	5365960
	Frozen Tunas (030349)	0.147	74676.44 (LKA)	78313.39
India	Castor Oil and its frations (151530)	529	16645.3 (THA)	16676.21
	Husked brown rice (100620)	230	559505 (MMR)	659974.8
	Broken rice (100640)	206	364877 (THA)	557434.9
	Meat and edible offal of fowls (020714)	42.4	775410 (THA)	777784.2
	Frozen Tunas (030349)	38.6	74676.4 (LKA)	78313.4
Myanmar	Cardamoms (090830)	854	44418.84 (NPL)	107682.5
	Vegetable and Mixture of Vegetables (071190)	100	9247.77 (IND)	12580.47
	Mucilages and thickeners of locust beans (130232)	85.3	531215.1 (IND)	531714.2
	Frozen Tunas (030349)	75.2	74676.44 (LKA)	78313.39
	Coconut dessicated (080111)	35.7	86703.63 (LKA)	90494.85
	Manioc fresh or dried (071410)	9.01	524196 (THA)	530493
	Other nuts, fresh or dried (080290)	8.31	77914.6 (THA)	115697.3
	Other meat salted or smoked (021090)	0.1	184245 (THA)	184313
Nepal	Frozen Fish (030379)	1.74	427043.2 (IND)	651347
Sri Lanka	Frozen boneless bovine meat (020230)	592	3062579 (IND)	3064395
	Other nuts, fresh or dried (080290)	59.9	77914.6 (THA)	115697.3
	Mushroom fresh or chilled (070951)	22.8	4158.4 (THA)	5043.4
Thailand	Crude Coconut Oil (151311)	4120	53718.5 (LKA)	56869.42

Note: Authors' calculations. This table has been tabulated only for year 2019. All values are in thousand USD.

Table 6: BIMSTEC's export capacity for selected imported products

De (2019) also points out that it is the non-tariff barriers that are holding back BIMSTEC trade growth. Hence, it'll be interesting to know their impact on the BIMSTEC setup. In the next section, SPS measures taken in BIMSTEC will be analyzed in detail.

5 SPS notifications: Stylized facts for BIMSTEC

Sanitary and Phytosanitary measures are taken by each country to ensure safety concerns of edible products. Same way, BIMSTEC members have adopted several measures for the imported agricultural commodities. These measures are notified to the WTO for better transparency. Here in this section we will analyse the WTO notification related to SPS in several dimensions.

All the communiques to the WTO regarding SPS measures are classified into several types. Primarily, there are two types of notifications, Regular and Emergency. Apart from these, there are several other kind of notifications which are just a kind of supplementary to regular or emergency notifications. For regular notifications, these include 'Revision to regular notification', 'Addendum to regular notification' and 'Corrigendum to regular notification'. Same kind of supplementary notifications exist for the emergency notifications. In this article, we do an analysis for the regular and emergency kind of notifications as they contain the primary and significant information about SPS standards adopted by any country.

Regular notifications may be defined as the notifications which are communicated to the WTO regarding the adoption of SPS standards from time to time without any exigency of immediate adoption or implementation. They provide sufficient time to the parties to submit their comments. Regular notifications are more prevalent in business. At the moment of writing, the total number of such notifications is 22712 across the countries. Whereas emergency notifications usually contain the immediate need for adoption and implementation. Sometimes, the trading parties are not given sufficient time to submit their reservations. These are not so prevalent and used in a limited sense. At the moment of writing, the total number of such notifications notified by all countries in the world is 3539. Regular notifications may create a trade dispute, but the possibility of becoming a trade dispute for such notifications is relatively lower than for emergency notifications. Out of 22712, only 259 notifications ended up in a trade dispute. Hence, the possibility of becoming a trade concern for regular notifications is 1.14%, whereas such possibility for emergency notifications is 1.41% as the number of emergency notifications related to a dispute is 50.

Table 7 charts out the types and numbers of the notifications in BIMSTEC. Here, Of all, 42% (484) notifications are the emergency ones, whereas the global statistic is 15.6% for this. This skewness is coming from Thailand's frequent use of emergency channel. In fact, Thailand has issued more emergency notifications than the regular ones. Total number of notifications of Thailand is 1.8 times the total number of notifications issued by all other members in BIMSTEC. India has the second-highest number of notifications issued in the region. Barring these two, other members do not issue such notifications more frequently as per data. In this entire region, the least notifica-

tions issued are by Myanmar. Bangladesh has never taken any emergency channel for notifying SPS standards.

Further, it will be interesting to know the regions or the countries against such notifications that have been issued by BIMSTEC member countries. Table 8 provides these details. Except for Thailand and Myanmar, each BIMSTEC member country's emergency notifications apply to all the countries in the world. Myanmar has issued only one emergency notification, shown in Table 7, and this is for the African countries that are swine fever-infected. But if we look at Thailand, out of 471 emergency notifications, 24 notifications are only India-specific, which apply to India only, while 31 are Myanmar-specific. Out of all, there are only 7 notifications that apply to all the countries in the world. In this case, it can be said that Thailand is more country-specific when it comes to the issuance of emergency notifications.

	Types of Notifications		
Country	**Regular**	**Emergency**	**Total**
Bangladesh	11	0	11
India	297	8	305
Myanmar	7	1	8
Nepal	42	1	43
Sri Lanka	43	3	46
Thailand	266	471	737
Total	666	484	1150

Table 7: Types of Notification in BIMSTEC

When a country adopts a standard, it usually follows a guideline or recommendation to ensure that there is uniformity across the standards for any product. These guidelines or recommendations (Codex Alimentarius, IPPC, and WOAH) are based on scientific evidence. As mentioned earlier, the countries are advised to follow these but sometimes they do not. The number of regular notifications across the countries that don't follow the set guidelines is 9182, while for the emergency notifications, it is 195, which turns out, in percentage, as 40.4% and 5.5%, respectively. Table 9 provides such statistic for BIMSTEC. For BIMSTEC, this statistic is 31.8% and 5.5% for regular and emergency notifications, respectively, that don't follow the set guidelines. In the region, the member country India adopts the most standards that don't follow such recommendations. Thailand stands at the top when it comes to not following the guidelines for emergency notifications. Still, we may posit that BIMSTEC member countries are following the international guidelines or recommendations in the adoption of such standards in comparison to other

Country	**Emergency Notifications and the regions**
India	All countries (8)
Myanmar	African swine fever infected countries (1)
Nepal	All countries (1)
Sri Lanka	All countries (3)
Thailand	All countries (7), India (24), Myanmar (31)

Table 8: Emergency Notifications against BIMSTEC

countries. SPS notifications are not always harmful; they may be trade-facilitating. The WTO labels such notifications as trade-facilitating because the idea behind the adoption of any such SPS standard is quite innocuous and trade-enhancing, or sometimes, this kind of notification may remove bureaucratic bottlenecks by setting an easy and transparent standard. For example, suppose a country adopts a standard for a maximum residue limit of a particular pesticide usage in an imported food product; the consumers of that country may start considering this a healthier product to eat, then the import of such commodity may be enhanced. So, in this sense, this kind of SPS adoption may become a trade-facilitating SPS measure. Table 10 is for trade facilitating notifications, which presents a very contrasting pattern for BIMSTEC member countries. The two bigs of BIMSTEC are not the flag-bearers here while the small country Nepal has adopted 28 trade facilitating standards. It should be noted that Nepal has issued a total of 43 notifications, and out of these 28 are trade-facilitating, while Thailand, which has issued 737 notifications, has adopted just a single trade-facilitating measure. Out of 305 notifications, India has taken only 3 trade facilitating measures. There are 4352 trade facilitating notifications issued by all the countries using both regular and emergency notifications. There are no trade-facilitating emergency notifications for BIMSTEC. In total, 16.6% notifications are trade facilitating by all countries in the world, while for BIMSTEC, this turns out as 2.86% only.

	Non-standard measures		
Country	**Regular**	**Emergency**	**Total**
Bangladesh	1	0	1
India	121	1	122
Myanmar	0	0	0
Nepal	13	0	13
Sri Lanka	11	2	13
Thailand	66	3	69

Table 9: Non-standard measures Notifications

Next, we analyze the trade concerns (or trade disputes) in BIMSTEC. Table 11 has chalked out this information for the region. Again, the big twos have issued such notifications which later became a trade dispute. In total, 19 notifications have been challenged by one or more trading partners in the SPS committee of the WTO. India leads the band here, which has 11 dispute-related notifications, while Thailand has 7. The reason behind this may be non-adherence to the international guidelines, standards

	Trade facilitating notifications		
Country	**Regular**	**Emergency**	**Total**
India	3	0	3
Myanmar	1	0	1
Nepal	28	0	28
Thailand	1	0	1

Table 10: Trade facilitating notifications

or recommendations. When SPS standards are adopted by any country without adhering to the set norms, it may become a problematic one. And this may be happening in the case of India. At the global level, there are 309 trade disputes, which means 1.1% of the regular and emergency notifications end up as a trade dispute. This statistic is 0.95%; comparatively low for BIMSTEC.

	Trade concerns		
Country	**Regular**	**Emergency**	**Total**
India	9	2	11
Thailand	5	2	7

Table 11: Trade concerns notifications

Next, we make an inquiry about what was the purpose or objectives behind the issuance of such notifications. Figure 6 shows the objectives enshrined in the notifications issued by member countries in BIMSTEC. There are primarily five objectives behind any notification. Out of them, the most prevalent or used objective is 'food safety' in BIMSTEC, but for Thailand, the most used objective is 'Animal health' while 'food safety' is the second most cited one. For Bangladesh, only 'food safety' has been cited. 'Protect humans from animal/plant pest or disease' is the second most cited reason or objective in BIMSTEC. Though the notifications cite a single reason also, they usually carry a combination of multiple objectives. This has been tabulated in the objective-wise analysis of the appendix. Moreover, a detailed analysis of the commodities and the regions for which notifications have been issued and also, the types of the notifications have been provided in the appendix part of the paper.

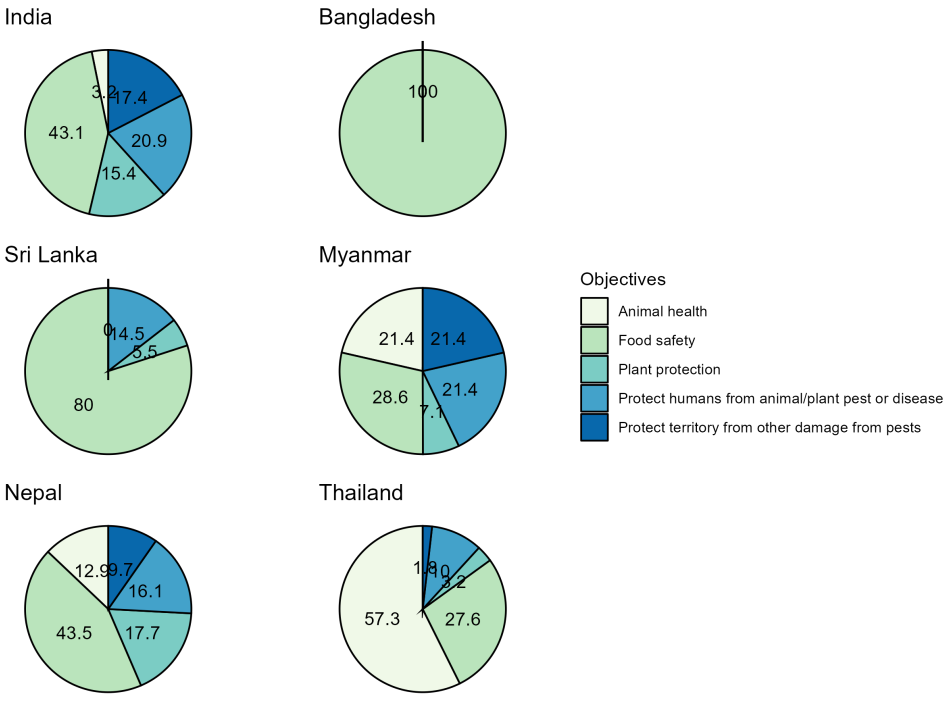

Figure 6: Objectives in the notifications

6 Gravity results

In this section, we discuss the results of the gravity analysis. The gravity model used here has been explained the methodology section. First, we'll discuss the main regressors here. In Table 12, the first model tells the impact of the number of all the regular and emergency notifications combined. The coefficient for 'Notifications' is negative and significant, which means that the exports go down by around 3% on average if one additional notification is issued. Model 2 examines the impact only for the regular notification. Its coefficient is almost the same in magnitude and significance level, hence the same interpretation. In model 3, for the emergency notifications, one additional emergency notification will reduce the export flow by around 15.5% on average. This shows that emergency notifications are more harmful to trade sentiments.

Table 13 shows the results for the non-standard notifications. In all the models of Table 13, the main regressors (NS_notifications, etc.) are not significant, which means they particularly do not impact the exports. In the first column of Table 14, the impact of trade facilitating notifications (Fc_notifications) has been analyzed, which turns out to be statistically insignificant, which means trade facilitating notifications do not contribute much to enhancing the export flows. In the second model of the same table, the impact of trade-dispute notifications (Trade_concern) has been examined. Trade concerns become most problematic as one additional trade dispute would bring down the export for that particular commodity by around 19% on average. Model 3 is a kind of consistency check where both coefficients are the same.

In Table 15, the objective analysis has been done for all five objectives cited behind the issuance of any notification. Food safety and Animal health are the two objectives that affect the export flows negatively, with an additional notification having these objectives will bring down the exports by 3% and 24.5%, respectively, on average. Other kinds of objectives do not impact the trade significantly. There are several combinations of objectives that may enhance the export.

In Table 16, we've analyzed such a combination of objectives. In column 1, the notifications with multiple objectives of 'Plant protection and Protect humans' would enhance the trade by 1.5%. 'Plant protection with Protect territory,' 'Protect humans with Protect territory' and 'Protect humans with Protect territory and Plant protection' will do so by 2.2%, 1.9%, and 0.3%, respectively. Our main covariate is the number of notifications here for which a robustness check has been done in the robustness section. Both the quantum and the significance levels are quite consistent in both setups.

'gdp_s' and 'gdp_d' stand for the GDP of the source and destination country, respectively. Their coefficient are quite consistent and statistically significant across the models, which are around 1.2 and 1, which means that if the source country's GDP increases by 1% , the export flows will increase by 1.2% on an average and vice-versa for the des-

tination country. Distance (dist) has a significantly negative impact on the export flows. These results are aligned with the findings of trade literature. The contiguity (contig) plays an important role in BIMSTEC. If two member countries are neighbors, their exports will be doubled in comparison to the scenario if they were not neighbors, which is also consistent with trade studies.

According to the gravity literature, the common language between two countries enhances trade flows, but in BIMSTEC, the common language (comlang) has a significant and negative impact on the export flows. One reason behind this could be the universalization of the English language in trade and commerce, and English is not a common language among BIMSTEC members. Surprisingly, there is no commonality in the official language among the BIMSTEC members. Ethnically, there are two pairs of India-Bangladesh and Nepal-Bhutan, which share the common ethnic language. The absence of a common language will certainly add cost to trade, and this has been shown in the results.

Social connectivity (social cnctvty) enhances exports between member countries, but its magnitude is low. Social connectivity here means the people-to-people contact. It is very straight-forward that if there is a good people-to-people connection between any two countries, it will surely enhance business between the two. Diplomatic disagreement (diplo disagree) between member countries does not impact the trade flows as this is not significant. The diplomatic disagreement in this region has not been very severe, and this is why they don't impact the business. Free trade agreements (fta) between member countries have accelerated trade between members as, in general, an FTA effectively decreases trade costs between two countries.

Hence, in our results here, all the independent variables except diplo_disagree are statistically significant, and they do affect the export flows in one way or the other.

	Dependent Variable: Ln(export)			
	(1)	(2)	(3)	(4)
Ln(gdp_s)	1.231***	1.231***	1.234***	1.233***
	(0.044)	(0.044)	(0.044)	(0.044)
Ln(gdp_d)	1.084***	1.080***	1.042***	1.094***
	(0.040)	(0.039)	(0.037)	(0.042)
Ln(dist)	-1.605***	-1.610***	-1.683***	-1.596***
	(0.228)	(0.228)	(0.225)	(0.229)
contig	0.740***	0.740***	0.720***	0.735***
	(0.122)	(0.122)	(0.119)	(0.122)
comlang	-1.760***	-1.756***	-1.711***	-1.769***
	(0.134)	(0.134)	(0.132)	(0.134)
social_cnctvty	0.00004***	0.00004***	0.00004***	0.00004***
	(0.000)	(0.000)	(0.000)	(0.000)
diplo_disagree	-0.343	-0.342	-0.398	-0.354
	(0.275)	(0.274)	(0.260)	(0.275)
fta	0.470***	0.471***	0.480***	0.466***
	(0.109)	(0.109)	(0.116)	(0.111)
Notifications	-0.029**			
	(0.013)			
Regular		-0.028**		-0.029**
		(0.013)		(0.012)
Emergency			-0.168*	-0.181*
			(0.091)	(0.092)
Year	Yes	Yes	Yes	Yes
Observations	606	606	606	606
R^2	0.709	0.709	0.707	0.709
Within R^2	0.690	0.690	0.688	0.690

Clustered (Year) standard-errors in parentheses

*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Table 12: Impact of SPS notifications on exports: Overall notifications

	Dependent Variable: Ln(export)			
	(1)	(2)	(3)	(4)
Ln(gdp_s)	1.229***	1.229***	1.231***	1.228***
	(0.045)	(0.045)	(0.044)	(0.045)
Ln(gdp_d)	1.041***	1.041***	1.028***	1.040***
	(0.037)	(0.037)	(0.035)	(0.038)
Ln(dist)	-1.672***	-1.672***	-1.698***	-1.675***
	(0.232)	(0.231)	(0.226)	(0.232)
contig	0.732***	0.733***	0.728***	0.737***
	(0.120)	(0.121)	(0.119)	(0.120)
comlang	-1.729***	-1.730***	-1.699***	-1.730***
	(0.126)	(0.126)	(0.132)	(0.126)
social_cnctvty	0.00004***	0.00004***	0.00004***	0.00004***
	(0.000)	(0.000)	(0.000)	(0.000)
diplo_disagree	-0.348	-0.349	-0.393	-0.356
	(0.262)	(0.262)	(0.259)	(0.262)
fta	0.492***	0.493***	0.488***	0.497***
	(0.116)	(0.116)	(0.113)	(0.114)
NS_Notifications	-0.021			
	(0.021)			
NS_Regular		-0.022		-0.022
		(0.021)		(0.021)
NS_Emergency			0.082	0.109
			(0.223)	(0.219)
Year	Yes	Yes	Yes	Yes
Observations	606	606	606	606
R^2	0.707	0.707	0.707	0.707
Within R^2	0.688	0.688	0.687	0.688

Clustered (Year) standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Table 13: Impact of SPS notifications on exports: Non-standard notifications

	Dependent Variable: Ln(export)		
	(1)	(2)	(3)
Ln(gdp_s)	1.258***	1.254***	1.255***
	(0.040)	(0.040)	(0.040)
Ln(gdp_d)	1.062***	1.079***	1.082***
	(0.035)	(0.037)	(0.036)
Ln(dist)	-1.613***	-1.574***	-1.580***
	(0.257)	(0.256)	(0.257)
contig	0.668***	0.679***	0.676***
	(0.128)	(0.130)	(0.129)
comlang	-1.489***	-1.484***	-1.481***
	(0.130)	(0.133)	(0.133)
social_cnctvty	0.00004***	0.00004***	0.00004***
	(0.000)	(0.000)	(0.000)
diplo_disagree	-0.377	-0.388	-0.384
	(0.262)	(0.272)	(0.273)
fta	0.518**	0.538**	0.536**
	(0.245)	(0.244)	(0.245)
Fc_Notifications	0.108		0.108
	(0.087)		(0.084)
Trade_concern		-0.206*	-0.206*
		(0.116)	(0.116)
Year	Yes	Yes	Yes
Observations	606	606	606
R^2	0.707	0.708	0.708
Within R^2	0.688	0.689	0.689

Clustered (Year) standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Table 14: Impact of SPS notifications on exports: Trade facilitating notifications and Trade concern

	Dependent Variable: Ln(export)				
	(1)	(2)	(3)	(4)	(5)
Ln(gdp_s)	1.232***	1.240***	1.231***	1.235***	1.232***
	(0.044)	(0.043)	(0.045)	(0.046)	(0.044)
Ln(gdp_d)	1.075***	1.072***	1.033***	1.009***	1.039***
	(0.038)	(0.033)	(0.040)	(0.039)	(0.039)
Ln(dist)	-1.613***	-1.651***	-1.690***	-1.715***	-1.683***
	(0.228)	(0.224)	(0.226)	(0.225)	(0.223)
contig	0.729***	0.729***	0.729***	0.688***	0.730***
	(0.123)	(0.121)	(0.123)	(0.124)	(0.120)
comlang	-1.753***	-1.749***	-1.701***	-1.700***	-1.701***
	(0.133)	(0.134)	(0.132)	(0.133)	(0.132)
social_cnctvty	0.00004***	0.00004***	0.00004***	0.00004***	0.00004***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
diplo_disagree	-0.332	-0.431	-0.389	-0.360	-0.391
	(0.274)	(0.266)	(0.261)	(0.256)	(0.263)
fta	0.465***	0.436***	0.484***	0.479***	0.478***
	(0.111)	(0.111)	(0.114)	(0.116)	(0.113)
Food_safety	-0.032**				
	(0.014)				
Animal_health		-0.281***			
		(0.095)			
Plant_protection			-0.011		
			(0.050)		
Protect_territory				0.081	
				(0.050)	
Protect_humans					-0.019
					(0.020)
Year	Yes	Yes	Yes	Yes	Yes
Observations	606	606	606	606	606
R^2	0.709	0.710	0.707	0.707	0.707
Within R^2	0.690	0.691	0.687	0.688	0.688

Clustered (Year) standard-errors in parentheses

*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Table 15: Impact of SPS notifications on exports: Objective-wise

	Dependent Variable: Ln(export)			
	(1)	(2)	(3)	(4)
Ln(gdp_s)	1.235***	1.237***	1.237***	1.236***
	(0.046)	(0.046)	(0.046)	(0.046)
Ln(gdp_d)	1.009***	1.007***	1.007***	1.010***
	(0.037)	(0.036)	(0.036)	(0.036)
Ln(dist)	-1.714***	-1.716***	-1.714***	-1.711***
	(0.225)	(0.225)	(0.225)	(0.225)
contig	0.691***	0.679***	0.679***	0.686***
	(0.124)	(0.126)	(0.125)	(0.124)
comlang	-1.698***	-1.698***	-1.697***	-1.697***
	(0.132)	(0.132)	(0.132)	(0.132)
social_cnctvty	0.00004***	0.00004***	0.00004***	0.00004***
	(0.000)	(0.000)	(0.000)	(0.000)
diplo_disagree	-0.369	-0.355	-0.362	-0.361
	(0.254)	(0.253)	(0.251)	(0.251)
fta	0.480***	0.475***	0.470***	0.473***
	(0.118)	(0.116)	(0.116)	(0.116)
Plant_protection * Protect_humans	0.015***			
	(0.005)			
Plant_protection * Protect_territory		0.022***		
		(0.007)		
Protect_humans * Protect_territory			0.019***	
			(0.006)	
Protect_humans * Protect_territory * Plant_protection				0.003***
				(0.001)
Year	Yes	Yes	Yes	Yes
Observations	606	606	606	606
R^2	0.707	0.708	0.708	0.708
Within R^2	0.688	0.689	0.689	0.689

Clustered (Year) standard-errors in parentheses

*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Table 16: Impact of SPS notifications on exports: Multiple objectives

7 Conclusion

Several points could be proffered as a concluding remark. Firstly, the region BIMSTEC is not as integrated as it should be. There is a lot of scope and capacity to align each member's interest in commodity trade that must be exploited. This is not just for the intra-trade in BIMSTEC; there is ample room to increase the world share of BIMSTEC in agri-trade.

Secondly, when it comes to the issuance of SPS notifications, small economies in the region do not take recourse to emergency notifications due to the fact that they are more dependent on their neighbors, and a stringent measure may stymie the commodity supply to their county while the big twos of BIMSTEC have used them intensively. Out of them, Thailand has been engaged in issuing more emergency notifications than the regular ones, where the emergency notifications are more detrimental to the export flows in BIMSTEC. Though it is their prerogative to adopt a standard for a commodity, the countries should exercise restraint in their enactment. There are small economies in the region that may be hurt more by these activities, and for these countries, agricultural trade takes a major chunk in their export basket.

Thirdly, our gravity results are in line with the established literature's gist. SPS measures are, in general, detrimental to the trade flows in BIMSTEC, while a trade dispute hurts more. SPS measures become more severe when the objective of a notification is to protect animal health. Apart from these, BIMSTEC member countries should seriously strive to make this region a free trade area by signing an agreement as an FTA would surely help in trade growth of this region.

There are certain things that need to be done in order to increase regional integration and trade flows. There is an urgent need to set up an 'institutional regulatory and cooperative (IRC)' mechanism for the region regarding SPS measures. The SPS measures adopted by member countries may not be the same or uniform, especially the measures of LLDCs, but if they provide the same level of protection, they must be accepted by the member countries. For this, the 'equivalence' and 'mutual recognition' framework should be enacted through IRC. Through this institutional setup, efforts should be made also to harmonize SPS standards across the member countries. Since the transparency and real-time exchange of information is the key to resolving any trade deadlock, the BIMSTEC members should engage among themselves through IRC to disseminate the information.

Second, this is the capacity building of BIMSTEC member countries that will help a lot in terms of market penetration of advanced countries as well as intra-regional trade. This capacity-building program might include initiatives to improve the scientific and technical expertise, training the manpower regarding the knowledge of SPS functioning both within government and food supply chains, creation of SPS-related resources and

infrastructure etc. Since India and Thailand have enough capacity in these dimensions, they must extend a helping hand for these initiatives.

Third, the BIMSTEC FTA should be finalized quickly and it must contain the provision regarding SPS measures as an FTA with SPS provision may dampen the ill-effects of severe SPS measures. This chapter on SPS should include the specificities of the region's small economies. Also, the rules of origin in FTA should be negotiated in such a way that they are favorable to the small economies too.

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Appendix 1

Region-wise analysis of SPS notifications

Note: An SPS notification issued by a country may apply to more than one trade partner, hence the number reported in Tables 17-22 need not match the numbers reported in Table 7. Table 17 shows that Bangladesh has issued 11 notifications, which apply to all countries/regions, while according to Table 21, India has issued 269 notifications applying to all countries and 3 notifications specific to Nepal.

Regions	Occurrences
All countries	11

Table 17: SPS Notifications issued by Bangladesh region-wise

Regions	Occurrences
All countries	46

Table 18: SPS Notifications issued by Sri Lanka region-wise

Regions	Occurences
African Swine Fever infected countries	1
All countries	7

Table 19: SPS Notifications issued by Myanmar region-wise

Regions	Occurrences
China	1
All countries	42

Table 20: SPS Notifications issued by Nepal region-wise

Regions	Occurrences	Regions	Occurrences
All countries	269	Nigeria	1
Argentina	1	Philippines	1
Australia	2	Portugal	1
Australia	1	Rwanda	1
Brazil	1	South Africa	2
Chile	1	Spain	2
France	1	Tanzania	1
Germany	2	United Kingdom	1
Ghana	1	United States of America	1
Greece	1	Uzbekistan	1
Hungary	1	Serbia	1
Italy	1	Georgia	1
Japan	1	Bangladesh	1
Kenya	1	Bhutan	1
Malawi	1	Myanmar	1
Malaysia	1	Nepal	3
Netherlands	1	Thailand	1

Table 21: SPS Notifications issued by India region-wise

Regions	Occurrences	Regions	Occurrences
All countries	262	Perak States (Malaysia)	2
Poland	34	Portugal	2
Indonesia	31	Ukraine	2
Viet Nam	31	Albania	1
Germany	30	Andong City (Republic of Korea)	1
Philippines	26	Azerbaijan	1
Belgium	23	Beijing Province	1
France	23	Bosnia and Herzegovina	1
United Kingdom	23	Croatia	1
Hungary	22	Cyprus	1
China	20	Daxing District	1
Cambodia	15	England	1
Bulgaria	14	European Communities	1
Italy	13	Former Yugoslav Republic of Macedonia	1
Lao People's Democratic Republic	13	Kinmen and Matsu (Chinese Taipei)	1
Republic of Korea	19	Korea	1
South Africa	19	Kyonggi-Do Province	1
Chinese Taipei	17	Kyongsang-Bukdo	1
Netherlands	17	Lixian Town	1
United States of America	9	Longtou Village	1
Denmark	7	Mexico	1
Japan	7	Miyazaki Province	1
Spain	7	Niger	1
Ecuador	5	Penghu	1
Madagascar	5	Pocheon city	1
Austria	3	Romania	1
Brazil	3	Sweden	1
Canada	3	Swindon Town	1
Czech Republic	3	Vietnam	1
Malaysia	7	Wiltshire Province	1
Israel	3	Zimbabwe	1
Slovak Republic	3	the Separate Customs Territory of Taiwan	1
Slovenia	3	the United States	1
Switzerland	3	Myanmar	32
United States	3	India	24
Australia	2		
Finland	2		
Ireland	2		
Greece	3		
Kazakhstan	2		
Liechtenstein	2		
Luxembourg	2		

Table 22: SPS Notifications issued by Thailand region-wise

Appendix 2

Product-wise analysis of SPS notifications

Note: Typically, a SPS notification issued by a country may cover more than one product. Hence, the numbers reported in Tables 23-28 need not match the numbers reported in Table 7. Table 23 shows that the notifications issued by Bangladesh cover all food products in general, while according to Table 24, Sri Lanka's notifications are for many different types of commodities. In all notifications issued by Sri Lanka, 'Preparations of vegetables, fruit, nuts' comes 12 times.

Regular notifications	
HS Code and description	Occurrences
Food products in general	11

Table 23: Product-wise notifications issued by Bangladesh

Regular notifications		Emergency notifications	
HS Code and description	Occurrences	HS Code and description	Occurrences
Preparations of vegetables, fruit, nuts (20)	12	Dairy products, and of animal origin (04)	3
Food products in general	21	Live animals (01)	2
Dairy products, and of animal origin (04)	12	Meat and edible offal (02)	1
Vegetables and certain roots (07)	8	Animal originated products (05)	1
Misc. edible preparations (21)	8		
Preparations of cereals, flour, starch or milk (19)	5		
Beverages, spirits and vinegar (22)	5		
Meat and edible offal (02)	4		
Products of the milling industry (11)	4		
Animal or vegetable fats and oils (15)	4		
Food industry, produce and wastes thereof (23)	4		
Cereals (10)	3		
Plastics and articles thereof (39)	3		
Live animals (01)	2		
Oil seeds and oleaginous fruits (12)	2		
Salt; sulphur; earths, stone; plastering materials (25)	2		
Fish and crustaceans, molluscs (03)	1		
Animal originated products (05)	1		
Trees and plants products (06)	1		
Coffee, tea, mate and spices (09)	1		
Cocoa and cocoa preparations (18)	1		
Pharmaceutical products (30)	1		
Wood and articles of wood (44)	1		

Table 24: Product-wise notifications issued by Sri Lanka

Regular notifications		Emergency notifications	
HS Code and description	Occurrences	HS Code and description	Occurrences
Fruits and nuts (08)	75	Live animals (01)	17
Food products in general	70	Meat and edible offal (02)	14
Vegetables and certain roots (07)	53	Animal originated products (05)	10
Trees and plants products (06)	49	Food industry, produce and wastes thereof (23)	5
Dairy products, and of animal origin (04)	45	Dairy products, and of animal origin (04)	3
Meat and edible offal (02)	37	Food products in general	1
Live animals (01)	32		
Preparations of vegetables, fruit, nuts (20)	27		
Animal or vegetable fats and oils (15)	25		
Misc. edible preparations (21)	21		
Animal originated products (05)	18		
Cereals (10)	16		
Plastics and articles thereof (39)	16		
Preparations of cereals, flour, starch or milk (19)	14		
Food industry, produce and wastes thereof (23)	14		
Coffee, tea, mate and spices (09)	13		
Beverages, spirits and vinegar (22)	13		
Oil seeds and oleaginous fruits (12)	11		
Meat and edible offal (02)	9		
Products of the milling industry (11)	8		
Fish and crustaceans, molluscs (03)	7		
Wood and articles of wood (44)	7		
Live animals (01)	6		
Salt; sulphur; earths, stone; plastering materials (25)	6		
Meat, fish or crustaceans, molluscs; preparations thereof (16)	5		
Cocoa and cocoa preparations (18)	5		
Lac; gums, resins and other vegetable saps (13)	4		
Sugars and sugar confectionery (17)	3		
Organic chemicals (29)	3		
Inorganic chemicals (28)	2		
Pharmaceutical products (30)	2		
Chemical products n.e.s. (38)	2		
Vegetable plaiting materials (14)	1		
Albuminoidal substances; modified starches (35)	1		
Rubber and articles thereof (40)	1		
Natural, cultured pearls; stones (71)	1		

Table 25: Product-wise notifications issued by India

Regular notifications		Emergency notifications	
HS Code and description	Occurrences	HS Code and description	Occurrences
Animal or vegetable fats and oils (15)	31	Meat and edible offal (02)	6
Oil seeds and oleaginous fruits (12)	28	Live animals (01)	1
Meat and edible offal (02)	26	Animal originated products (05)	1
Vegetables and certain roots (07)	26	Animal or vegetable fats and oils (15)	1
Fruits and nuts (08)	24	Meat, fish or crustaceans, molluscs; preparations thereof (16)	1
Raw hides and skin and leather (41)	20		
Cereals (10)	18		
Products of the milling industry (11)	18		
Animal originated products (05)	17		
Dairy products, and of animal origin (04)	16		
Preparations of vegetables, fruit, nuts (20)	16		
Coffee, tea, mate and spices (09)	14		
Food industry, produce and wastes thereof (23)	14		
Wool, fine or coarse animal hair (51)	14		
Live animals (01)	13		
Fish and crustaceans, molluscs (03)	10		
Trees and plants products (06)	8		
Lac; gums, resins and other vegetable saps (13)	4		
Vegetable plaiting materials (14)	4		
Rubber and articles thereof (40)	4		
Meat, fish or crustaceans, molluscs; preparations thereof (16)	3		
Preparations of cereals, flour, starch or milk (19)	2		
Misc. edible preparations (21)	2		
Tobacco and manufactured tobacco substitutes (24)	2		
Articles of leather; saddlery and harness (42)	2		
Furskins and artificial fur (43)	2		

Table 26: Product-wise notifications issued by Myanmar

Regular notifications		Emergency notifications	
HS Code and description	Occurrences	HS Code and description	Occurrences
Vegetables and certain roots (07)	17	Live animals (01)	2
Food products in general	9	Meat and edible offal (02)	1
Coffee, tea, mate and spices (09)	9	Dairy products, and of animal origin (04)	1
Trees and plants products (06)	8		
Beverages, spirits and vinegar (22)	8		
Dairy products, and of animal origin (04)	7		
Fruits and nuts (08)	7		
Cereals (10)	7		
Live animals (01)	5		
Animal or vegetable fats and oils (15)	5		
Preparations of vegetables, fruit, nuts (20)	4		
Products of the milling industry (11)	3		
Preparations of cereals, flour, starch or milk (19)	3		
Meat and edible offal (02)	2		
Animal originated products (05)	2		
Oil seeds and oleaginous fruits (12)	2		
Food industry, produce and wastes thereof (23)	2		
Lac; gums, resins and other vegetable saps (13)	1		
Vegetable plaiting materials (14)	1		
Meat, fish or crustaceans, molluscs; preparations thereof (16)	1		
Sugars and sugar confectionery (17)	1		
Cocoa and cocoa preparations (18)	1		
Misc. edible preparations (21)	1		
Tobacco and manufactured tobacco substitutes (24)	1		
Wood and articles of wood (44)	1		

Table 27: Product-wise notifications issued by Nepal

Regular notifications		Emergency notifications	
HS Code and description	Occurrences	HS Code and description	Occurrences
Meat and edible offal (02)	525	Meat and edible offal (02)	506
Live animals (01)	493	Live animals (01)	471
Dairy products, and of animal origin (04)	451	Dairy products, and of animal origin (04)	409
Animal originated products (05)	325	Animal originated products (05)	313
Food products in general	50	Fish and crustaceans, molluscs (03)	12
Misc. edible preparations (21)	40	Food products in general	4
Fish and crustaceans, molluscs (03)	32	Animal or vegetable fats and oils (15)	3
Beverages, spirits and vinegar (22)	28	Meat, fish or crustaceans, molluscs; preparations thereof (16)	2
Food industry, produce and wastes thereof (23)	24	Lac; gums, resins and other vegetable saps (13)	1
Animal or vegetable fats and oils (15)	16	Food industry, produce and wastes thereof (23)	1
Fruits and nuts (08)	14	Albuminoidal substances; modified starches (35)	1
Trees and plants products (06)	13		
Oil seeds and oleaginous fruits (12)	11		
Vegetables and certain roots (07)	10		
Cereals (10)	10		
Preparations of cereals, flour, starch or milk (19)	10		
Coffee, tea, mate and spices (09)	8		
Meat, fish or crustaceans, molluscs; preparations thereof (16)	7		
Cocoa and cocoa preparations (18)	4		
Preparations of vegetables, fruit, nuts (20)	3		
Organic chemicals (29)	3		
Albuminoidal substances; modified starches (35)	3		
Nuclear reactors, boilers, machinery (84)	3		
Lac; gums, resins and other vegetable saps (13)	2		
Salt; sulphur; earths, stone; plastering materials (25)	2		
Pharmaceutical products (30)	2		
Plastics and articles thereof (39)	2		
Raw hides and skin and leather (41)	2		
Wood and articles of wood (44)	2		
Optical, photographic, cinematographic (90)	2		
Vegetable plaiting materials (14)	1		
Sugars and sugar confectionery (17)	1		
Paper and paperboard (48)	1		

Table 28: Product-wise notifications issued by Thailand

Appendix 3

Objectice-wise analysis of SPS notifications

Note: Typically, a SPS notification issued by a country contains more than one objective, hence the number reported in Tables 29 need not match the numbers reported in Table 7.

Objectives	Occurrences
Animal health	462
Animal health; Food safety	5
Animal health; Food safety; Protect humans from animal/plant pest or disease	5
Animal health; Protect humans from animal/plant pest or disease	22
Animal health; Protect humans from animal/plant pest or disease; Plant protection	1
Animal health; Protect humans from animal/plant pest or disease; Protect territory from other damage from pests	4
Animal health; Protect territory from other damage from pests	5
Food safety	414
Food safety; Plant protection	1
Food safety; Plant protection; Protect humans from animal/plant pest or disease; Protect territory from other damage from pests	3
Food safety; Plant protection; Protect territory from other damage from pests	1
Food safety; Protect humans from animal/plant pest or disease	82
Plant protection	29
Plant protection; Protect humans from animal/plant pest or disease	2
Plant protection; Protect humans from animal/plant pest or disease; Protect territory from other damage from pests	66
Plant protection; Protect territory from other damage from pests	11
Protect humans from animal/plant pest or disease	3
Protect humans from animal/plant pest or disease; Plant protection; Food safety	1
Protect humans from animal/plant pest or disease; Protect territory from other damage from pests	11
Protect humans from animal/plant pest or disease; Protect territory from other damage from pests; Food safety	3
Protect territory from other damage from pests	1

Table 29: Occurrences of multiple objectives in BIMSTEC notifications

Appendix 4

Robustness check

In the following table, we do a robustness check for the main covariates- 'Notifications', 'Regular' and 'Emergency'. In their places, we take the trade-inhibiting notifications. The coefficients for trade-inhibiting notifications are same as those of the former ones as our results are robust.

	Dependent Variable: Ln(export)			
	(1)	(2)	(3)	(4)
Ln(gdp_s)	1.232***	1.232***	1.234***	1.235***
	(0.044)	(0.044)	(0.044)	(0.044)
Ln(gdp_d)	1.088***	1.084***	1.042***	1.098***
	(0.040)	(0.039)	(0.036)	(0.042)
Ln(dist)	-1.601***	-1.605***	-1.684***	-1.592***
	(0.228)	(0.228)	(0.225)	(0.229)
contig	0.737***	0.738***	0.719***	0.731***
	(0.122)	(0.122)	(0.119)	(0.122)
comlang	-1.762***	-1.758***	-1.711***	-1.771***
	(0.134)	(0.134)	(0.132)	(0.134)
social_cnctvty	0.00004***	0.00004***	0.00004***	0.00004***
	(0.000)	(0.000)	(0.000)	(0.000)
diplo_disagree	-0.341	-0.340	-0.400	-0.354
	(0.277)	(0.276)	(0.261)	(0.278)
fta	0.462***	0.464***	0.479***	0.457***
	(0.109)	(0.109)	(0.115)	(0.111)
In_Notifications	-0.031**			
	(0.014)			
In_Regular		-0.031**		-0.031**
		(0.013)		(0.013)
In_Emergency			-0.171*	-0.183**
			(0.087)	(0.088)
Year	Yes	Yes	Yes	Yes
Observations	606	606	606	606
R^2	0.709	0.709	0.707	0.710
Within R^2	0.690	0.690	0.688	0.691

Clustered (Year) standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Table 30: Impact of SPS notifications on exports: Trade inhibiting notifications