Discussion Paper

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Towards Sustainable and Seamless Air Transport Connectivity: Facilitating Single Sky for the Himalayan Region

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Abstract

Himalayas – is not merely a geographical notation, but an eco-system with superior connectivity needs. This eco-system is unique in its identity and mighty in its coverage. It directly and indirectly touches upon the lives of around one third of the world's population across eight countries as in parts of Bangladesh, China, India and Pakistan, in entire Nepal, Bhutan and in Afghanistan and Myanmar. The landscape comprises enclaved and landlocked territories, unnavigable mountain terrains, thick forests and some of the world's largest river systems.

Put together, the region is home to millions of ''mountain, forest and river-dependent low income, vulnerable and isolated communities''. The meagre economic status of the inhabitants is mainly caused by inadequate road, rail and related logistics infrastructure that remained unaddressed due to geographical and environmental issues.

Air connectivity can be a favourable alternative to land transport infrastructure for a region as Himalayas. However, having grown by leaps and bounds in other parts of the world, air connectivity in the Himalayas, conversely, presents a completely different picture. Notwithstanding that the region is home to a considerable portion of the world's population, air connectivity here remains one of the poorest. It is further exacerbated by existing air connectivity infrastructure capacity and services performance gaps within and among urban, non-urban plains and mountains in the countries involved.

In that context, strengthening existing capacities, interlinking and expanding regional air connectivity networks which are supported by coherent and non-intrusive regulations become vital for two purposes i.e. to: (1) interconnect underserved places and communities and, (2) accelerate regional cooperation in order to address capacity constraints.

This paper, therefore, attempts to contextualise possible solutions to air connectivity problems in the regions of Himalayas. The objective is to garner discourse and acceptance about fostering a doable and seamless air connectivity access into the region. It also charts out a ''Regional Air Connectivity Mandala'' (Fig. 3) comprising logical air-corridors to encourage shared future of peace, prosperity, inclusivity and sustainability for people in the region.

1. Background and Context

The global air transport industry, which includes the network of aircraft operators, airports, ground staff, cabin crew, freight forwarders who provide related travel management and cargo aggregation, handling and forwarding services, acts as the backbone of connectivity in the modern economy.[1] The industry connects communities and businesses and provides an essential support system for international and domestic trade and travel.[2] This has increasingly made the industry an indispensable component of development as also evident from the fact that air transport is being recognised to play a leading role in various aspects of 15 out of the 17 Sustainable Development Goals (SDGs).[3] Out of them, the following 08 are the most served by air transport industry[4]:

Table 1: Air Transport and Sustainable Development Goals

SDG 5: Gender Equality	Encouraging gender balance in the sector by involving women as important participants in the workforce
SDG 7: Affordable and Clean Energy	Encouraging development and utilisation of sustainable fuel and deployment of renewable energy infrastructure at airports
SDG 8: Decent work and Economic growth	Enhancing job creation by providing employment opportunities for skilled personnel
SDG 9: Industry, innovation and infrastructure	Increased investment in Research and Development and building new infrastructure
SDG 10: Reduced Inequalities	Enhancing connectivity and democratising air travel to reach the masses and thereby reduce prevailing inequalities by establishing more robust and affordable air routes for trade and travel
SDG 12: Responsible Consumption and Production	Reduction in waste generation and encouraging governments to take up recycling. Furthermore, improving operational efficiency and reduce emissions
SDG 13: Climate Action	Acting upon climate action plan in the short, medium and long term through emission reductions, utilisation of sustainable aviation fuel and smart use and management of air traffic and renewable infrastructure
SDG 17: Partnership for the Goals	Perhaps one of the most important factors, partnerships across and between all sectors of the industry and governments (through international and regional cooperation) are essential to make the most of the developmental potential that particular industry holds

Being significantly instrumental, potential for establishing a sustainable air transport market that embodies seamless air connectivity and furthers socio-economic development is particularly essential for regional blocks, which consist of developing nations. A case in point is the Himalayan region in Asia.

[1] *Air Transport and the Sustainable Development Goals (2017), available at* https://aviationbenefits.org/media/166149/inside_abbb2017_atag_web_fv.pdf
[2] *Ibid.*
[3] *Ibid.*
[4] *Ibid.*

1.1. Description of the Himalayan Region

Himalayan Region represents geographies that fall within Himalayas and related territories, which are *inter-alia* connected with each other through Karakoram and Hindu Kush mountain ranges and river support systems that emanates from them. This, in view of the geographical scope of this paper, is justified with definitions made available by specialised agency as Integrated Centre for Mountain Development (ICIMOD). The overall region, according to ICIMOD, is denoted as Hindu Kush Himalayan region encompassing a clear majority of populations spread across 3,500 square kilometre of area in eight countries (as in Table 2).

Table 2 indicates corresponding areas within eight political boundaries of **Afghanistan**, **Bangladesh**, **Bhutan**, **China, India**, **Myanmar**, **Nepal** and **Pakistan.**

Table 2: Regional Coverage Area

Country	Area(s) Covered
Afghanistan	All provinces except Kandahar, Helmand, Nimroz, Farah, and Herat
Bangladesh	Chittagong Hill Tracts
Bhutan	Whole country
China	Parts of Yunnan (Diqing, Nujiang, Dali prefectures), Sichuan (Ganzi, Aba, Liangshan prefectures), Gansu (Gannan, Wuwei, Zhangye prefectures), Xinjiang (Kashigar, Kezilesu, Hetian, Altai prefectures), whole of Tibet Autonomous Region and Qinghai
India	The 11 mountain states (Arunachal Pradesh, Himachal Pradesh, Jammu and Kashmir, Uttarakhand; Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, and Tripura) and Darjeeling district of West Bengal
Myanmar	The states of Kachin, Chin, Shan and Rakkhain
Nepal	Whole country
Pakistan	North Western Frontier Province (NWFP), Federally Administered Tribal Areas (FATA), Northern Areas, Ajad Jammu and Kashmir (AJK), and 12 districts of Baluchistan]

Source: International Centre for Integrated Mountain Development (available at http://www.icimod.org)

The entire region looks fragile yet it presents a unique opportunity for addressing the region's exhaustive transport infrastructure and connectivity pursuits, particularly through air. That is while keeping the ecological sanctity of the most revered mountain ranges and river basins intact besides intensifying socio-economic gains for the welfare of concerned communities.

The following sections assess regional air connectivity and transport facilitation gaps through travel and tourism, cargo and regulatory governance perspectives to identify scope and areas for co-operation.

2. State of Air Connectivity for Regional Tourism

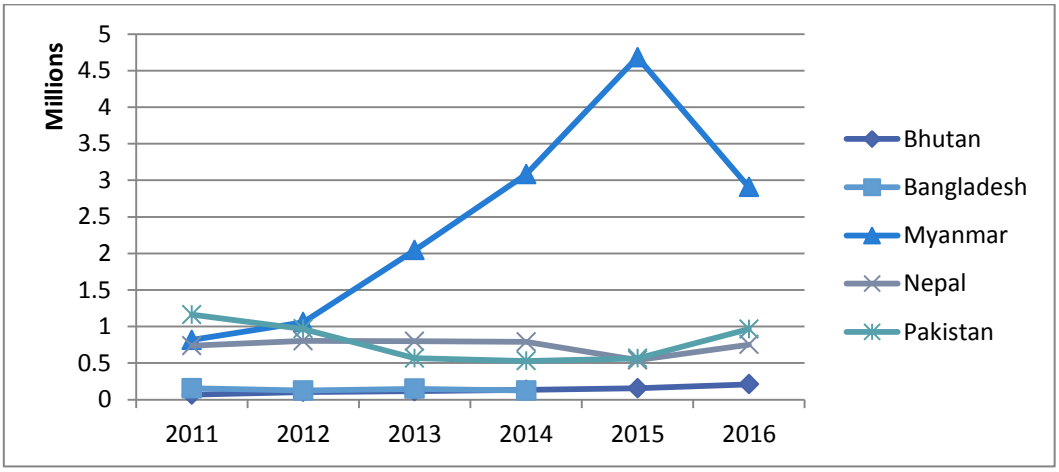
Travel and tourism has experienced continued expansion over the past and has diversified into one of the fastest growing sectors of the global economy.[5] Globally, international tourist arrivals have escalated from 25 million in 1950 to 1,235 million in 2016.[6]

Growth in 2016 was led by the Asia-Pacific region, which witnessed a 9 per cent increase in international arrivals. In fact, the Himalayan destinations have grown into an important tourist attraction and particularly offer the modern tourist a widespread range of possibilities.[7] Its cultural richness and unique topography make the region one of the most attractive tourist destinations in the world. Naturally, tourism has emerged as one of the most important revenue generators for countries in the region and holds immense importance from the development perspective as well.

For instance, Bangladesh, Bhutan and Nepal collectively generated approximately US$810 million in revenue through receipts from international tourism in 2016 (World Bank, 2017). It is no surprise that tourism has remained one of the most important sectors of the economy for these countries.

Other countries in the Himalayan region such as Pakistan, India and China have also started to witness steady increase in tourist activity after a general slump in the previous decade (See Figures 1 and 2). Figure 1 Number of tourist arrivals in Bhutan, Bangladesh, Myanmar, Nepal and Pakistan (2011-2016). There is lack of such data on Afghanistan's tourist arrivals however; available data on receipts from international tourism in Afghanistan have witnessed a steep decline since 2013.

Figure 1: Tourism Arrival 2011-16

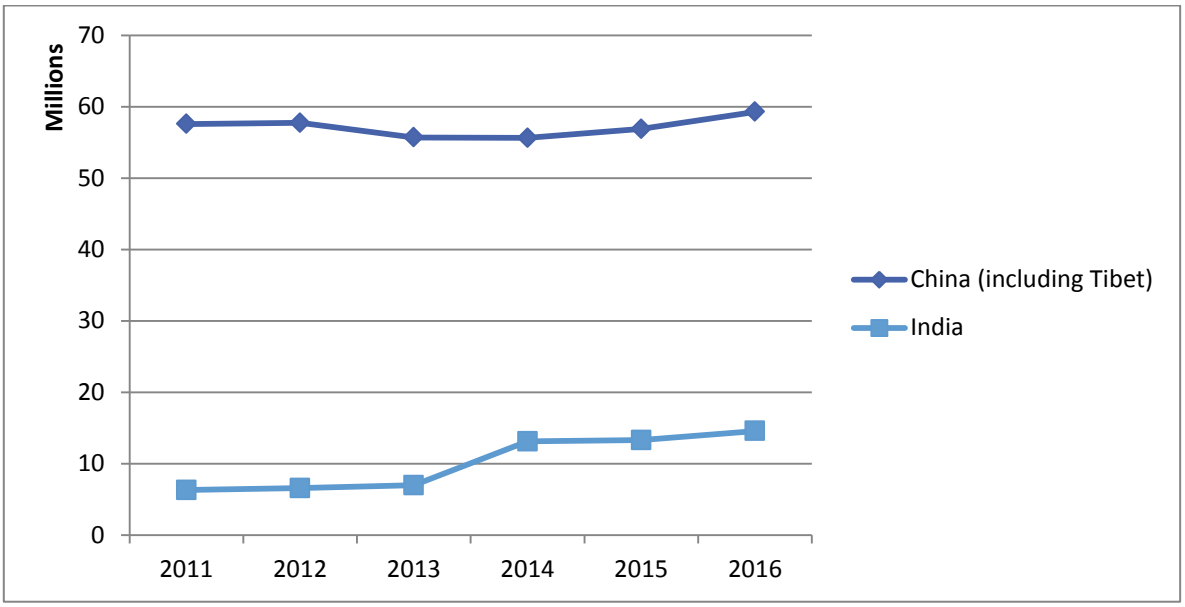


Source: The World Bank

[5] *UNWTO, Tourism Highlights, 2017, available at https://www.e-unwto.org/doi/pdf/10.18111/9789284419029*
[6] *Ibid.*
[7] *Spaltenberger, T. Tourism in the Himalayas, available at http://www.spaltenberger.de/usa/himalayantourism.pdf*

Figure 2 represents whole of China including the Tibet Autonomous Region (TAR).

Figure 2: Tourist Arrivals in China and India: 2011-16



Source: The World Bank

2.1. Existing Air Service Routes

One of the most important prerequisites of framing and implementing any national policy on tourism is to establish and maintain domestic, inter-regional and intra-regional connectivity. This also requires better transportation services by surface and air transport modes. However, air transport remains largely untapped and underprepared in the Himalayan region and ironically, it holds huge potential in terms of spurring regional and international tourist activity.

In view of analysing the way regional passenger connectivity can be improved, this paper analysed the present routes and identified broad bottlenecks from the passenger's perspective. This includes an analysis of travel times and the routes available for regional travellers.

Annexure-1 includes information on eight select countries i.e. **Afghanistan**, **Bangladesh**, **Bhutan**, **China, India**, **Myanmar**, **Nepal** and **Pakistan.**

The data collected includes that of select routes from the major hubs of the respective countries and the time taken to travel by air on the said routes. At preliminary level, it displays the level of intra-regional connectivity between the select countries.

From the data, it is apparent that there are several examples of poor or no connectivity, which might go on to hamper the bright prospects of tourism in the region. There is absence of direct flights options and most of them are routed through a country outside of the region. For example, flights are directed through Dubai (UAE) and Kuala Lumpur (Malaysia), among others to facilitate Pakistan-Nepal, Afghanistan-Myanmar, Nepal-Myanmar, Tibet (PRC)–India and Myanmar-Tibet (PRC) connectivity. This is when air connectivity is analysed through major airports. If we consider non-major routes, air connectivity would be either non-existent or sub-optimal.

Noticeably, the connection from Lhasa to Karachi[8] would entail around 30 hours of flight time. Furthermore, an important source for outbound tourists, i.e., Pakistan is poorly connected with almost all countries in the region with majority of the flights falling in either yellow or red zone (annexure-1).

In a particular case of Bhutan, there seems to be a general lack of air connections from and to the country, which is an important tourist destination in the region (Bhutan is only connected through India, Bangladesh and Nepal).

For a more detailed analysis and to assess the scope of fluid air connectivity, the case of Bhutan (table 3) has been explored in detail.

Table 3: The Case of Bhutan

Air connectivity: Broad trends
Bhutan was particularly selected for the detailed analysis because of the following reasons: • It is a landlocked country in the Himalayan region. Being so, one has only two options of entering the country, i.e. through air or land • Tourism is a major source of revenue for Bhutan • Regional visitors[9] that require no visa to arrive in Bhutan exceed the number of international tourists • There is significant scope for improvement in air connectivity (as per preliminary analysis of flight availability and time) Bhutan's tourism industry contributes significantly towards socio-economic development by facilitating generation of revenue and employment.[10] However, a preliminary analysis points towards the lack of optimal connectivity by air and considering its rising demand as a popular destination for international and regional tourists, there is considerable scope for improvement. The following data (Table 3.1) portrays that although the percentage of regional visitors has considerably risen from 2013, yet a significant number of such visitors prefer entering Bhutan via land than air. On the other hand, international tourists have no other option but to arrive via flights, but they must redirect their journeys as per the established routes. Despite the rising levels of total arrivals, the proportion of international arrivals has decreased and that of regional visitors has increased from 2014-2016 (from 49 to 70 per cent). The number of regional tourists has increased perhaps due to the non-dependence on flights, but international arrivals, particularly from Europe, North America and South America, which depend highly on-air travel, have remained stagnant or even decreased in number. In addition to this, regional arrivals clearly prefer to enter the country via land. Despite the rising tourist demand of Bhutan, it seems that there is scope to improve its underlying framework for air connectivity.

[8] Route- Karachi – Beijing – Chengdu – Lhasa, Annex 1 (Table)

[9] *Regional visitors do not require visas. Countries include India, Bangladesh and Maldives (in decreasing order of the number of visitors).*

[10] *Tourism Council of Bhutan, Bhutan Tourism Monitor, Annual Report, 2016*

Table 3.1 : Bhutan Tourism Statistics

Indicator/Year	2013	2014	2015	2016
Total arrivals	116000	133480	155000	210000
Regional visitors[11] (percentage of total)	-	49%	62.91%	70%
Regional visitors arriving by air	-	6%	26.68%	31%
Percent of international visitors arriving by air	89.84%	98%	90%	93%
Most popular air connection	Bangkok – Paro	Bangkok - Paro	Bangkok - Paro	Bangkok – Paro
Global Segmentation of Source Markets for Bhutan (%)				
Asia/Pacific	48.43	55.77	48.87	56.10
Europe	30.39	26.05	30.40	26.00
North America	18.57	15.35	18.35	16.00
South America	1.95	2.08	1.74	1.30
Middle East	0.44	0.49	0.40	0.50
Africa	0.21	0.25	0.25	0.20

Source: Tourism Council of Bhutan, Bhutan Tourism Monitor, 2013-2016

Moving on to the critical infrastructure, Bhutan has a total of four airports, namely Gelephu, Bathpalathang, Yongphulla and Paro International Airport. There are two airlines, which run international and domestic services, i.e., Druk Air and Bhutan Airlines. Druk Air is Bhutan's national carrier. Both provide international flights into Bhutan's international airport located in Paro, about one-and-a-half hours drive from Thimphu.[12] Their routes have been mentioned below:

Druk Air:

- Bangkok (BKK – Thailand)
- Delhi (DEL – India)
- Mumbai (BOM – India)
- Kolkata (CCU – India)
- Bagdogra (IXB – India)
- Gaya (GAY – India)
- Guwahati (GAU – India)
- Kathmandu (KTM – Nepal)
- Dhaka (DAC – Bangladesh)
- Changi (SIN – Singapore)

Bhutan Airlines:

- Bangkok (BKK – Thailand)
- Delhi (DEL – India)
- Kolkata (CCU – India)
- Kathmandu (KTM – Nepal)

Evidently, there are only five countries that are connected to Bhutan, i.e., Singapore, Thailand, India, Nepal and Bangladesh. This also confirms the previous finding, i.e., in the Himalayan region, Bhutan is

[11] *Regional visitors do not require visas. Countries include India, Bangladesh and Maldives (in decreasing order of the number of visitors).*

[12] *See https://www.bhutantravelbureau.com/getting-to-bhutan/*

not directly connected with Pakistan, China, Myanmar and Tibet (PRC). Moreover, as Bhutan does not share an open border with China, travelers are only allowed to drive into Bhutan from the southern side.[13] From the aforementioned, it seems that despite the growing tourist potential of the country over the years, there still remain bottlenecks in terms of regional connectivity, flight availability, frequency and choice.

Having said that, it is important to acknowledge that the activity via air transport is already set to further develop due to the government's efforts through which new domestic air links have been established and the country has branded itself as a major market in South Asia for tourists.[14] Accordingly, total air passenger traffic at Paro is expected to grow to about 491,200 persons per annum by 2020.[15] However, due to challenging terrain and weather conditions, there is a requirement to ensure that any such efforts are led by adequate focus on safety and security.

Hence, alongside improving connectivity through optimising the existing flight routes and establishing new ones, there is scope to establish cross-linkages with other countries, particularly within "the Himalayan Region" to improve the technological foundations of prevalent airport infrastructure.[16] Also, there is a possibility to explore development of other domestic airports into international ones as the central, southern, and eastern regions are not so well connected through road or air.[17]

There is significant scope to shorten the length of majority of the flights, which are routed through a third country i.e. Colombo, Dubai and Singapore by connecting at least the major cities in each country directly.

Needless to mention, considering the tourism potential of the region, there is an untapped demand of establishing efficient, affordable and direct air connectivity routes within the region.

2.2. Overview of the Visa Regime

Visa regulations for travel remain one of the most difficult challenges to facilitate transboundary movement of people within the Himalayan region. This can be attributed to geopolitical factors, security concerns, protracted territorial disputes, presence of conflict zones, militarisation of borders etc. amongst some of the countries. These have resulted in the one of the most prohibitive and restrictive visa regulations in the region.

Countries offer different types of visas with diverse procedures to different partner countries in the region. The provisions regarding consular service charges, visa processing duration, validity of the visa etc. vary from country to country. Some countries explicitly mention further restrictions on visa for citizens of certain countries. Only a few of the Himalayan countries allow their citizens to travel without visas but largely it remain restrictive and the process of obtaining visas, wherever applicable, is strictly exhaustive.

Though some countries offer visa-on-arrival and online visa application facility, the multiplicity of documents and recommendations required for visa approval, makes it a herculean task. For instance, business person travelling from Nepal/Bhutan/India/Bangladesh to Afghanistan/Pakistan will need multiple documents

[13] *See https://www.drukasia.com/bhutan-travel/tips/how-to-go-bhutan/*
[14] *See https://www.adb.org/sites/default/files/linked-documents/cps-bhu-2014-2018-ssa-03.pdf*
[15] *Ibid.*
[16] *Ibid.*
[17] *Kunaka Charles, Bhutan: Connectivity in the Cloud(s), available at http://blogs.worldbank.org/trade/bhutan-connectivity-clouds*

attested from various ministries and requires recommendation letter from relevant ministry/Chamber of Commerce. Or, a Nepalese citizen travelling to Afghanistan will need to travel to New Delhi to avail Afghanistan Consular Services. Furthermore, visa-on-arrival is only applicable for entry at specially designated airports. Similarly, the visa regime as in case of Tibet (PRC)-India is restrictive. For example, Indians who wish to travel to Tibet (PRC) will have to undergo a tedious process of obtaining visa that too only for group travel as no individual tourist visa is issued to Indian citizens through the Chinese residential mission in New Delhi.[18]

In case of intersecting South Asian Association for Regional Cooperation (SAARC) region, it took 15 years for the authorities to issue 200 business visa exemption stickers to eminent business leaders. A source in the South Asia Regional Initiative (SARI) that aims at civil aviation regulatory convergence and harmonisation in South Asia indicated that recently a Pakistani expert who previously got visa to visit Bangladesh was, without any explanation, denied visa second time despite providing substantiating document together with his application. A similar example included business visas being denied by Maldivian authorities to Indian nationals due to political tensions between the countries.

This assumes alarming proportions due to the fact that tighter visa regulations even for the national representatives will mean highly restrictive access to common tourists and businesses. Rigid visa provisions will consequently undermine any effort of creating seamless and harmonised air transport connectivity in the Himalayan region.

3. Air Freight and Market Access Gaps

Air Freight is cargo, except airmail, and is the fastest option in transporting time sensitive and high value to weight goods worldwide. To put into context, "*if categorised by volume and value then less than 1 per cent of global freight is flown by air. In terms of value, that less than 1 per cent represents more than 35 per cent of the global freight*" (IATA, 2016). In the 2005-15-year timeframe, the volume of air freight has increased by 21 per cent and is poised to grow further, owing to boom in e-commerce and business focus in supply chain optimisation, particularly in cross-border segments (Boeing, 2016).

The main factor behind such prospects is just-in-time logistics preparedness of air cargo primarily for the supply of critical parts to aerospace and automobile industries, smartphones apart from frequent supplies to the finest fashion and travel retail outlets globally. Air transport is a preferred transport mode for shipping precious ornaments, expensive watches, currency and premium liquor. In addition, it delivers unparalleled economy of time in transporting perishable commodities such as flowers, fruits, vegetables and sea food products to inland and overseas markets. However, such dimension of air cargo is not yet leveraged by most countries in the Himalayan region due to lack of private sector interest, infrastructure, operational and regulatory inefficacies. Following are market related instances:

3.1. Himalayan Air Cargo Industry

Air cargo in the Himalayan Region caters to 12 per cent of the world's air freight, of which China constitutes around 90 per cent (2016) whereas Bhutan is the lowest 0.00277 per cent in terms for Freight million-ton km (FTK) carried in 2016 (table 4). India witnesses 16 per cent growth in the 2010-16 period and stands second to China with just 8 per cent FTK share in 2016. On the reverse, Afghanistan, Bangladesh, Nepal, Myanmar and Pakistan shows negative FTK trends in 2016 when compared to their 2010 levels. The reasons could be

[18] Available at http://in.china-embassy.org/eng/lsfw/qz/t61659.htm; Accessed on 18 June 2018.

manifold, however, from the market perspective they could be lack of industries, agro produce-outreach and exposure, supply chain optimisation, investment in transport infrastructure and its services, individual country preferences, among others.

Table 4: Regional and World Air Freight Comparison:

(in RTK or Freight million-ton-km.) two digits after decimal)

Country/ Year	2016	2015	2014	2013	2012	2011	2010
Afghanistan	29.01	33.1	34.28	84.62	116.66	109.42	108.01
Bangladesh	53.97	57	207.73	225.18	152.31	159.69	164.42
Bhutan	0.65	0.53	0.92	0.63	0.47	0.48	0.42
China	21304.58	19805.63	17822.58	16053.73	15568.75	16764.86	17193.87
India	1893.88	1833.84	1851.32	1733.76	1579.22	1702.7	1630.96
Nepal	4.89	4.53	4.59	5.75	5.76	6.48	6.46
Myanmar	5.06	3.38	3.9	2.86	3.82	3.53	2.06
Pakistan	175.47	183.17	204.62	292.76	286.07	297.68	332.95
Himalayan Region	**23467.51**	**21921.18**	**20129.94**	**18399.29**	**17713.06**	**19044.84**	**19439.15**
World	**195162.2**	**187615.6**	**184831.1**	**175829.6**	**175051.3**	**183037.2**	**182025.6**
Region to World %	12.02462	11.68409	10.89099	10.46427	10.11878	10.4049	10.67935

Source: Data from database: World Development Indicators, Last Updated, March 2018

Despite Afghanistan, Bhutan, Myanmar, Nepal and Tibet Autonomous Region (PRC) being the producers of finest quality of vegetables and fruits, among other agricultural commodities, their farm produce lack market access even within the region, let alone their global supplies. For example, the mountainous Nepal produces excellent quality of strawberries and grapes, but this landscape is unable to get competitive edge for such produce due to infrastructure and supply chain-related inefficiencies.

In plains, particularly in Birganj, Nepal has food processing, agro-based and other industries with huge prospects for larger investments, however, representatives of large enterprises cite lack of connectivity to support their investment decisions. To put this into perspective, investors from Bihar and Uttar Pradesh in India primarily will have to take a detour through Delhi and Kathmandu to reach Birganj in Nepal. An alternative option, for instance, could be direct air connectivity sectors as in Delhi/ Mumbai-Patna – Raxaul (India) or Simara (Nepal) and then by car to Birganj, but this is yet far from being worked out.

This will not only encourage big corporates in India and China to have exposure to such landscapes in the Himalayan region but also foster time sensitive value and supply chain linkages. The cost factor can further be optimised by developing and providing multi-modal connectivity and achieving economies of scale in the nearshoring business. The latter is achievable as countries with 1 per cent better air cargo connectivity engage in 6 per cent more trade (IATA, 2016).

4. Governance and Regulatory Air Connectivity Frameworks

Air transport between the countries in the region is governed by various bilateral Air Services Agreements (ASA) prepared on the guidelines of Chicago Convention.

The following table 5 depicts details of various bilateral ASA signed by the countries of the region. All countries have signed bilateral ASA mutually with the exception of Afghanistan and Nepal. The ASA clearly outlines the terms of air connectivity between two nations with respect to number of seats allotted for flights originating from a country, the destinations and routes those countries should adhere to, etc. The countries have revised the entitlements, seat capacities and flying destinations, etc over the years according to the developments in air transport landscape of respective countries. For instance, India and Nepal initially agreed for 24 services every week to two destinations in each other's territory but eventually, the air services agreement was amended to accommodate growing demand and now stands at 30,000 seats per week to multiple destinations (annexure-2 section D).

Usually, the government designates multiple carriers to carry out air services. Hence, the term designation means carrier/airline operator designated by the Government of respective countries to provide air services in the government's name. The ASA between India and Pakistan designates only single carrier. Consequently, Air India and Pakistan International Airlines are the only carriers allowed to operate between the two countries. With the exception of India and Pakistan, all other countries in the region have made provisions for designating multiple carriers in their respective ASAs (Annexure-2 section B).

However, many routes and number of flights allowed in various ASAs have not materialised due to lack of demand, commercial non-viability, lack of infrastructure etc. For instance, Nepal has signed ASA with Pakistan, which includes multiple destinations (annexure-2 section A). There is not a single service from Pakistan to Nepal due to economic-non viability and political reasons. This is notwithstanding the fact that the services from Pakistan to Nepal have huge potential for profitability if services are routed through Delhi and Mumbai in India.

This can be attributed to various barriers, both physical and non-physical, to aviation connectivity in the region. Physical barriers include infrastructural constraints at various airports like runway capacity, aircraft parking, cargo processing, passenger handling and safety and security facilities. Many carriers in the region operate considerably aged fleet that makes the maintenance and operation very expensive.

The non-physical barriers can be restrictive regulatory framework in terms of visa, number of passengers and flights. Similarly, high airport usage charges, lack of professional airport management and improper pricing strategy act as barriers. Private participation, which is very crucial for the development of air connectivity, is also very low in most countries of the region. Furthermore, lack of skilled workforce, professionals, and technicians trained in aviation specific aspects is virtually non-existent in the region. There is a pressing need for aviation training institute or university par excellence to train more professionals if the air transport sector has to develop.

4.1. Status and Scope for Regulatory Harmonisation

In order to make regulations to be effective, they should maintain a certain degree of homogeneity and ideally be uniform. Though countries in Himalayan region do not have harmonised regulations in the aviation sector, some of the countries have taken concentrated efforts to bring cohesiveness in their policies and rules for air transport. Three major such efforts are South Asia Regional Initiative (SARI), Cooperative

Development of Operational Safety and Continuing Airworthiness (COSCAP)-South Asia and Aviation Partnership Program (APP) (also see annexure 3).

The initiatives mentioned above are governed by a Steering Committee Director General of Civil Aviation from seven South Asian countries as its members. Since programs like SARI[19], COSCAP – SA[20] and APP[21] are supported by the European Aviation Safety Agency, these programs conduct training programs to member countries on the lines of standards evolved in the European Union. The objective of these courses are to bring homogeneity in Regulatory Auditing Techniques, Issuing Operational Approvals to carriers, Ground Handling and air crew standards, Issuing Aircraft maintenance licence, etc.

To date, a complete set of airworthiness regulation has been developed and is under implementation. Meanwhile, discussions have started on the development of flight operation and flight crew licensing regulations.

But all these initiatives are limited to regulatory matters and have not yet achieved their objectives of streamlining. ,

- Licensing structure of carriers, personnel, technicians
- Examination (syllabus) for carriers, personnel, technicians, agencies
- Experience requirement of carriers, personnel, technicians, agencies
- Procedures used by various authorities

The role of aviation in trade, development and employment generation has been overlooked by most member states. This can be attributed to the fact that most member countries consider these initiatives as low priority and consequently there are no concentrated efforts being made to implement and execute plans in a time bound manner. For instance, member states even fail to attend steering committee meetings systematically when they are arranged by these programmes or when they attend their representation remain below the expected level.

Furthermore, it is important for countries to be able to create flexibility to the framework of programs, so as to accommodate local resource conditions. An imitation of European regulations framework through projects such as SARI, COSCAP-SA, APP etc. in the Himalayan region could do more harm than good.

The Aviation Regulatory Authorities in each country should be empowered, devolved with more powers and provided independence to ensure regulatory effectiveness. The following table represents regulatory frameworks and their key highlights of the country wise governance of civil aviation in the Himalayan region.

Table 5: Existing Regulatory Frameworks

Country	Institutional Civil Aviation Frameworks/Authority		Key Highlights (International)
	Policy	Authority	
Afghanistan	Afghanistan Civil Aviation Law (2012) Afghanistan Aviation Action Plan 2012	Civil Aviation Authority of Afghanistan	*Licensing more flights other than Ariana to commence International operations * Securing more bilateral Air Service Agreements

[19] *See Annexure 3*
[20] *See Annexure 3*
[21] *See Annexure 3*

Country	Institutional Civil Aviation Frameworks/Authority		Key Highlights (International)
	Policy	Authority	
Bangladesh	Civil Aviation Act, 2017	Civil Aviation Authority of Bangladesh	*Creating more international airports and terminals *Mandatory conditions for International Airlines operating in Bangladesh
Bhutan	Civil Aviation Act of Bhutan , 2000 Draft Bhutan Civil Aviation Bill,2015	Ministry of Information & Communications	* To secure more rights of International air traffic by Air Services Agreement
China	Civil Aviation Law of the People's Republic of China, 1996	Civil Aviation Administration of China	*Better airspace management *Efficient control on Air Traffic Flow *Focus on Air Safety by reducing Air Traffic control induced accidents *To develop an excellent pool of trained talents in aviation sector
India	National Civil Aviation Policy, 2016	Director General of Civil Aviation	* Relaxing the 5/20 criteria for international operations * Entering into 'Open Skies' agreement with SAARC nations
Myanmar	Myanmar Aircraft Act (Amendment) 2004 Myanmar Air transport Policy	Department of Civil Aviation	*Creating new carriers and airlines for international transport. *PPP mode for more aviation infrastructure and international terminals
Nepal	Civil Aviation Act, 2015 Civil Aviation Policy 2006	Civil Aviation Authority of Nepal	* Continuing the existing liberal skies policy and gradually pursuing open skies policy. *To get Nepalese airlines into code-sharing with international airlines and membership of alliance. * Pursue bilateral and multilateral Air Service Agreements with those countries with ample scope for tourism promotion.
Pakistan	National Aviation Policy, 2015	Pakistan Civil Aviation Authority	* Pursuing bilateral opens skies agreement * norms for flights to commence international operations liberalised * Allocating unutilized capacity of an airline to any other airline.

Source: Compiled by Authors through respective country websites and international agency (ICAO) sources

These countries should be encouraged to foster regulatory cooperation through regional and multilateral initiatives. The ultimate goal of such cooperation should be in direction of future mutual recognition of certificates, licence or approvals in this region but will remain impractical until "political" barriers are removed.

5. Conclusion: Exploring a Regional Connectivity Mandala

In furtherance to the aforementioned discussion, there is considerable scope to establish a hub-and-spoke air connectivity network in the Himalayan region. While there are several sub-regional networks, which are adequately connected such as New Delhi - Kathmandu - Dhaka and Kabul - Islamabad - Delhi, inter-connectivity within these sub-regions remains a bottleneck (such as between Kathmandu and Islamabad or Dhaka and Islamabad). The following air connectivity mandala (figure-3) has been recommended, subject to infrastructure requirements of the proposed airports. This indicative hub-and-spoke mandala has been suggested based upon preliminary findings of prevalent condition of air-connectivity and related bottlenecks. This of course would be an ideal scenario for connectivity and could act as a guiding framework for the whole region to work towards a collective goal.

Figure 3: Hub-and-Spoke Connectivity Mandala for the Himalayan Region

Source: Authors Compilation

In figure 3, boxed areas are supposed to act as hubs for air traffic. This means that they should ideally have the required infrastructural capability to handle relatively high traffic in a safe and efficient manner. As the hub would act as a major stop-over for airlines, each hub should ideally facilitate direct connectivity to a minimum of two other hubs and indirectly to the remaining ones via one transit stop only. This would create an ecosystem for airlines to enjoy economies of scale and scope if they wish to ply on a certain route.

The hubs would connect to the oval areas, which signify that there is subsequent viable connectivity from the hubs and passengers don't have to travel by other means of transportation in order to get to far flung areas in the Himalayan region. There might be significant geographical barriers to establish safe and efficient airports at these areas. Nevertheless, member states should try their best to establish well-functioning airports in these areas in order to maximise the potential of air connectivity, both in terms of regional tourism as well as trade. Investors from China, India and Singapore, among others will also benefit from such connectivity as they will quickly be able to zero in on Himalayan economies, their market potential and investment needs, make sound decisions and materialise their investment in a robust way. This could also

help in generating air traffic through potential new routes. The draft connectivity mandala can be further developed to explore robust air connectivity in the Himalayan region.

5.1. Policy considerations

- What are the basic prerequisites required to implement the aforementioned "Hub-and-spoke Air Connectivity Mandala" model?
- How can regulations and policies be aligned so as to promote regional infrastructure development of airports?
- What are the present rules regarding aircraft lease agreements in the region? How can the existing rules be relaxed so that more small and medium sized operators can successfully pursue aircraft leases and offer services to currently unserved/under-served locations in the region?
- With the aviation industry expected to create enormous employment opportunities, what mechanisms have been instituted to impart necessary skills, knowledge, training and technical support so as to train/develop qualified aviation professionals in the region?
- What measures can be adopted to ensure regulatory oversight or making sure that individual countries uniformly conduct and adhere to commonly adopted regulations?
- Since aviation regulation is an 'uncharted domain' in the Himalayan region, what measures can be adopted to deter the possibility of a regulatory capture from dominant countries of the region?
- What steps will be required to liberalise VISA regime and make possible for people in the region to travel without the requirement of VISA, such as in the SCHENGEN countries?

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Annexure-1: Data for passenger connectivity in the Himalayan region

Data for flights originating from **Afghanistan** to other destinations in the Himalayan region								
Indicator↓	**India**	**Pakistan**	**Nepal**	**Bangladesh**	**Bhutan**	**China**		**Myanmar**
						Mainland	**Tibet**	
Best Route	Kabul - New Delhi	Kabul - Islamabad	Kabul- New Delhi - Kathmandu	Kabul - Dubai -Dhaka	Kabul - New Delhi - Paro	-	-	Kabul - Dubai - Yangon
Time	01:55	01:15	07:00	02:15	-	-	-	21:10

Data for flights originating from **Bangladesh** to other destinations in the Himalayan region								
Indicator↓	**India**	**Pakistan**	**Nepal**	**Bhutan**	**Myanmar**	**China**		**Afghanistan**
						Mainland	**Tibet**	
Best Route	Dhaka - New Delhi	Dhaka – Dubai - Karachi	Dhaka- Kathmandu	Dhaka- Paro	Dhaka - Yangon	Dhaka- Guangzhou	Dhaka- Guangzhou - Lhasa	Dhaka - Dubai - Kabul
Time	02:35	10:15	01:45	01:00	02:15	03:35	11:50	13:15

Data for flights originating from **Bhutan** to other destinations in the Himalayan region								
Indicator↓	**India**	**Pakistan**	**Nepal**	**Bangladesh**	**Myanmar**	**China**		**Afghanistan**
						Mainland	**Tibet**	
Best Route	Paro-New Del	-	Paro - Kathmandu	Paro-Dhaka	-	-	-	-
Time	02:20	-	01:00	01:00	-	-	-	-

Data for flights originating from **India** to other destinations in the Himalayan region								
Indicator↓	**Pakistan**	**Nepal**	**Bangladesh**	**Bhutan**	**Myanmar**	**China**		**Afghanistan**
						Mainland	**Tibet**	
Best Route from major hub	New Del – Lahore (only 1 direct flight)	New Del - Kathmandu	New Del – Dhaka	New Del- Paro	New Del - Yangon	New Del – Shanghai	New Delhi- Kathmandu- Lhasa	New Delhi to Kabul
Time (hrs)[22]	01:40	01:30	02:10	02:20	04:00	05:45	06:15	2:30

Data for flights originating from **Myanmar** to other destinations in the Himalayan region								
Indicator↓	**India**	**Pakistan**	**Nepal**	**Bangladesh**	**Bhutan**	**China**		**Afghanistan**
						Mainland	**Tibet**	
Best Route	Yangon - New Del	Yangon (RGN) – Bangkok (BKK) - Karachi (KHI)	Yangon - Kuala Lumpur - Kathmandu	Yangon - Dhaka	-	Yangon (RGN) – Beijing (PEK)	Yangon (RGN) – Guangzhou (CAN) - Chengdu (CTU) - Lhasa	Yangon - Dubai - Kabul
Time	04:30	08:55	11:55	02:15	-	04:30	19:05	14:20

[22] Including layover

Data for flights originating from **Mainland China** to other destinations in the Himalayan region								
Indicator↓	**India**	**Pakistan**	**Nepal**	**Bangladesh**	**Bhutan**	**Myanmar**	**Tibet**	**Afghanistan**
Best Route	Shanghai – New Delhi	Beijing – Islamabad - Lahore	Shanghai – Hong Kong- Kathmandu	Guangzhou - Dhaka	-	Shanghai– Guangzhou – Yangon	Shanghai– Mianyang - Lhasa	-
Time	07:05	09:50	09:35	04:05	-	08:20	06:25	-

Data for flights originating from **Tibet Autonomous Region, China** to other destinations in the Himalayan region								
Indicator↓	**India**	**Pakistan**	**Nepal**	**Bangladesh**	**Bhutan**	**Mainland China**	**Myanmar**	**Afghanistan**
Best Route	Lhasa-Kathmandu -New Del	Lhasa (LXA) – Chengdu (CTU) - Beijing (PEK) - Islamabad (ISB) - Karachi (KHI)	Lhasa - Kathmandu	Lhasa – Kathmandu - Dhaka		Lhasa - Beijing	Lhasa (LXA) – Chengdu (CTU) - Beijing (PEK) – Yangon (RGN)	
Time (hrs)	08:05	31:05	01:35	04:40		03:45	13:15	

Data for flights originating from **Nepal** to other destinations in the Himalayan region								
Indicator↓	**India**	**Pakistan**	**Bangladesh**	**Bhutan**	**Myanmar**	**China**		**Afghanistan**
						Mainland	**Tibet**	
Best Route	Kathmandu – New Delhi	Kathmandu – Dubai - Karachi	Kathmandu - Dhaka	Kathmandu - Paro	Kathmandu - Kuala Lumpur - Yangon	Kathmandu – Chengdu - Shanghai	Kathmandu - Lhasa	Kathmandu - New Delhi - Kabul
Time (hrs)	01:45	09:20	01:30	01:00	10:00	08:00	01:25	06:15

Data for flights originating from **Pakistan** to other destinations in the Himalayan region								
Indicator↓	**India**	**Nepal**	**Bangladesh**	**Bhutan**	**Myanmar**	**China**		**Afghanistan**
						Mainland	**Tibet**	
Best Route	Lahore-New Del (only 1 direct flight)	Karachi – Dubai - Kathmandu	Karachi – Dubai - Dhaka	-	Lahore – Dubai - Yangon	Lahore- Dubai - Beijing	Karachi – Beijing – Chengdu - Lhasa	Islamabad - Kabul
Time	01:30	08:55	09:10	-	12:05	16:10	29:50	01:15

Source: Google search and Mayur Travels, Jaipur

Legend	
Connectivity	
Strong	Travel time up to 5 hours
Medium	Travel time between 5-10 hours
Poor	Travel time above 10 hours
-	No plausible air connectivity/ difficulty in finding best possible route

Annexure-2: Agreement and Allocation Provisions

A. Year of Agreement

	Myanmar	Nepal	India	Bhutan	China	Pakistan	Bangladesh	Afghanistan
Afghanistan	NA	NO	NA	NA	NA	NA	NA	2008
Bangladesh	NA	2005	NA	NA	NA	2011		NA
Bhutan	NA	2014	2005		NA	NA	NA	NA
China	NA	1998	2005	NA		1998	NA	NA
India*	NA	2009		2005	2005	2008	NA	NA
Myanmar		2006	NA	NA	NA	NA	NA	NA
Nepal**	2006		2009	2014	1998	2015	2005	NA
Pakistan***	NA	2015	2008	NO	2009		2011	2008

(NA- Data Not Available; No- No Bilateral Civil Aviation Agreement)

B. Carrier Designation

	Myanmar	Nepal	India	Bhutan	China	Pakistan	Bangladesh	Afghanistan
Afghanistan	NA	NO	Dual	NA	NA	NA	NA	
Bangladesh	NA	Multiple	Multiple	NA	NA	NA		NA
Bhutan	NA	Multiple	Multiple		NA	NA	NA	NA
China	NA	Multiple	Multiple	NA		NA	NA	NA
India*	Dual	Multiple		Multiple	Multiple	Single	Multiple	Dual
Myanmar		Multiple	Dual	NA	NA	NA	NA	NA
Nepal**	Multiple		Multiple	Multiple	Multiple	Multiple	Multiple	NA
Pakistan***	NA	Multiple	Single	NA	NA		NA	NA

C. Routes and Destinations

	Myanmar	Nepal	India	Bhutan	China	Pakistan	Bangladesh	Afghanistan
Afghanistan	NA	NA	NA	NA	NA	NA	NA	
Bangladesh	NA	NA	NA	NA	NA	NA	NA	NA
Bhutan	NA	Kathmandu	Chennai, Delhi, Mumbai, Kolkata, Guwahati, Gaya		NA	NA	NA	NA
China	NA	NA	NA	NA		NA	NA	NA
India**	NA	Kathmandu		Paro	NA	Islamabad	Dhaka	NA
Myanmar		NA	Mumbai, Delhi,Kolkata, Chennai	NA	NA	NA	NA	NA
Nepal	Yangon		Delhi, Mumbai, Bangalore, Chennai, Hyderabad, Kolkata	Paro	Beijing, Shanghai, Lhasa, Guangzhou, Kunming, Chengdu, Xi'an	Karachi, Islamabad, Sialkot, Multan and Faisalabad	Dhaka	NA
Pakistan***	NA	NA	NA	NA	NA		NA	NA

D. Allocation of Seats

	Myanmar	Nepal	India	Bhutan	China	Pakistan	Bangladesh	Afghanistan
Afghanistan	NA	NO	1600*	NA	NA	NA	NA	
Bangladesh	NA	7000	12000	NA	NA	NA		NA
Bhutan	NA	4200	7 flights to each destination (14 flights to Gaya)		NA	NA	NA	NA
China	NA	11200	42 flights*	NA		NA	NA	NA
India*	750	30000		49 flights*	42 flights *	4800	12000	1600*
Myanmar		5300	750	NA	NA	NA	NA	NA
Nepal**	5300		30000	4200	11200	3800	7000	NA
Pakistan***	NA	3800	4800	NA	NA		NA	NA

*Source: *As per 2005 Data, DGCA, http://dgca.nic.in/bilateral/Bilateral.pdf*

*** https://www.caanepal.org.np/basa/*

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Annexure-3: Regional Initiatives

SARI Project:

The South Asia Regional Initiative is a grouping of authorities from South Asia that was created during the EU-SA Civil Aviation Cooperation Programme, 2006 sponsored by the European Commission and the European Aerospace Industry.

The SARI member states , EASA and Airbus supports the project financially and technically to enhance aviation safety in South Asia. Since 2017, the EU funded South Asia Aviation Partnership Project (APP) also provide a significant financial contribution to SARI operations.

SARI technical activities are conducted in close cooperation with COSCAP South Asia. COSCAP-SA considers SARI as its technical arm in its objective to harmonise the regulations in South Asia.

The overall objective of SARI is to create a forum for the National Aviation Authorities and the civil aviation industry from South Asia to foster aviation regulatory convergence and harmonization in the region.

COSCAP-SA

Cooperative Development of Operational Safety and Continuing Airworthiness – South Asia , under the Aegis of ICAO, is a joint programme of seven SAARC countries (India, Pakistan, Nepal, Bhutan, Bangladesh, Srilanka and Maldives) . The project is aimed at assisting the participating states in developing their air regulations and standards and to improve their independent oversight capabilities.

Aviation Partnership Program (APP)

Over the next 20 years, South Asia's air traffic is forecast to have the highest growth rate in the world. This provides a significant challenge in the field of harmonisation of aviation regulations, safety oversight, infrastructural capacity development, and environmental protection. In this context, the EU- South Asia Aviation Partnership Project aims to support Asia in developing its capacity for safety oversight and improve the environmental performance of South Asian aviation sector. The APP will enhance the relations between South Asian institutions and European institutions working in the field of civil aviation.

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