Alfalfa in South Asia

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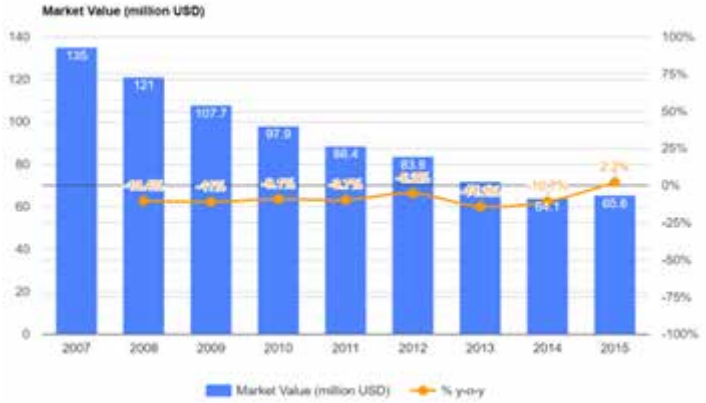
The objective of this paper is to gauge the data gap of the South Asian countries for having a reliable data for assisting the planning and developmental activities of Alfalfa production sector in terms of area cultivated, import/export, forage yields, main uses and problems encountered. The role of the annual agriculture survey is of much value, as it provides the profile of agriculture households in the country.

Pakistan: Agriculture contributes 22.7 percent to the GDP and provides employment to around 37.4 percent. Fodder occupied an area of 2.45 Mha producing 55.47 MT production from an area of 1.81 Mha. In Punjab, fodder crops occupy third place after wheat and cotton with average fodder yield of 21.6t/ha. Alfalfa is a major source of protein and included as basic component in rations for livestock with total production of 3.97 MT/144984h out of which 35-40ton/acre is in Punjab (7-11 cuts), 15-20 ton/acre in Sindh (5-6 cuts), 15-20 ton/acre in KPK (5-6 cuts) and 25-30 ton/acre in Balochistan (7-8 cuts). The total consumption of alfalfa in Dairy is 60%, Meat animals 25%, horses 15% and as dry mater 36-56%. During 2021, Pakistan imported Alfalfa Seed of *0.012 MT, Value Rs.0.588 M. while Exported 165.1 Tonns of alfalfa seed and 1254 Tonns of* Alfalfa meal & pellets. Alfalfa total production in Pakistan (2007-2015) indicated a decline in market value (Fig. 1). For intense dairy, intensive beef, and large beef and sheep production systems used as green chop, direct grazing, alfalfa meal or pellets. Commonly cultivated varieties include Sanghar, Shumaya, American, and some local accessions. The Asian region is home to a large number of dairy animals, cattle, sheep, goats and horses. There is a huge demand of alfalfa products as animal feed in this region hence market players have prominent growth opportunities in this region.

Figure 1. Alfalfa Total Production in Pakistan (2007-2015)



India: Alfalfa is grown approximately on an area of 1Mha in India with a total green fodder production of 60-130 tons/hectare/annum. It occupies the third position among fodder crops after sorghum and berseem in India. Usually grown in rabi season as an irrigated crop commonly in Punjab, Haryana, Uttar Pradesh, Rajasthan, Gujarat, Maharashtra, Tamilnadu and Madhya Pradesh. In one season, 7 to 8 cuttings can be taken with average fodder yield of 280 to 320 Qtl/acre with seed yield potential of 2.0 to 4.5 q/ha. It is used primarily as hay, silage, and as a cover crop. Direct grazing for dairy, alfalfa sprouts and pellets for horses and pets are also entertained. Other utilization of alfalfa is as by product which includes alfalfa tonic, herbal tea and sprouts/grain for salad and sandwiches in India. Different varieties developed and being cultivated are; LL composite 3: Suitable for growing in entire country. It is resistant to downy mildew and lodging, gives average yield of 156 qtl/acre. LL composite 5: It is a fast growing, tall annual variety having broad dark green leaves with purple flowers. Seeds of this variety are bold. It is resistant to downy mildew. It gives an average yield of 280 qtl/acre. Sirsa 8: It is developed at fodder research station Sirsa (Haryana). Suitable for cultivation in Punjab, Haryana, Delhi and UP. It gives an average yield of 140-160 qtl/acre of green fodder. Lucerne No 9L: It is developed by Punjab Agriculture University, Ludhiana. It is a quick growing variety with green foliage. Once planted it can provide fodder up to 5-7 years. It gives an average yield of 300 qtl/acre of green fodder per year. Chetak S 244: It is suitable for cultivation in Punjab, Haryana, Uttar Pradesh and Gujarat. It gives an average yield of 560 qtl/acre. Rambler: Suitable for cultivation in hilly areas. It gives an average yield of 240-360 qtl/acre per year. Other States Varieties includes IGFRI S 54, IGFRI S 244, Moopa, IGFRI S 112.

Bangladesh: The livestock sector makes an undeniable contribution to Bangladesh's economic growth, food and nutrition security, self-employment creation, and, most importantly, poverty alleviation. With the continuous efforts of the government, Bangladesh has achieved self-sufficiency in meat and egg production and has made promising progress in milk production. At constant prices, the contribution of livestock sector to the

GDP in FY 2021-22 is 1.90 percent and the contribution of livestock to the overall agricultural sector is 16.52 percent. The role of this sub-sector is immense in meeting the demand of essential animal protein of human body in daily diet. The number of cattle and poultry in the country in FY 2020-21 stood at 563.30 lakhs and 3,658.50 lakhs respectively. Hence a large amount of fodder is required to cope with this huge population of animals. The production value of Alfalfa in Bangladesh in 2021-2022 was 68.9 to 80.9 MUSD with average total consumption in between 271-689 thousand Tonns. Because of its high protein content, high intake potential, and digestibility, it is commonly utilized as green chop forage, hay, and pellets for horses and pets. The statistics of Alfalfa production and consumption in the country (2014-2022) are given in the Fig. 2 and 3.

Figure 2. Production Value of Alfalfa (million USD) of Bangladesh

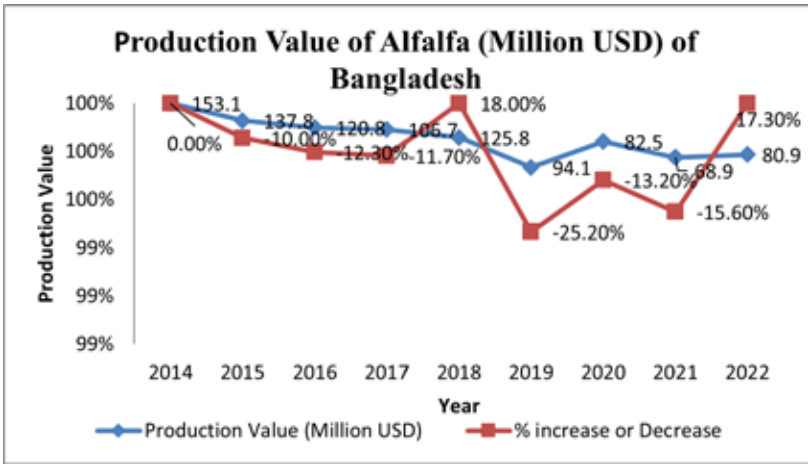


Figure 3. Consumption value of Alfalfa (thousand Tons) of Bangladesh

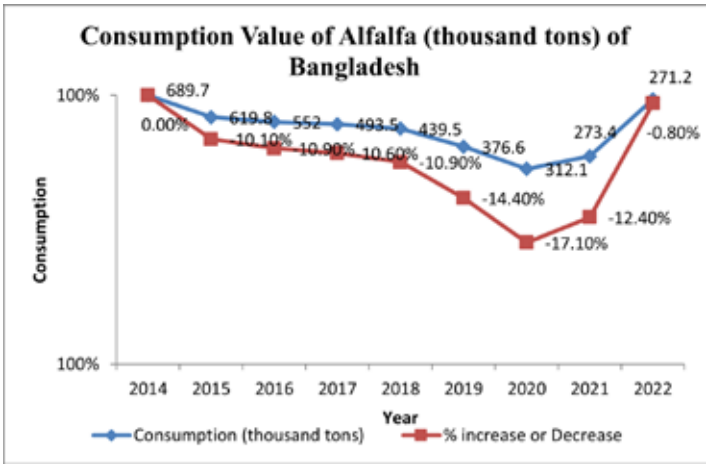
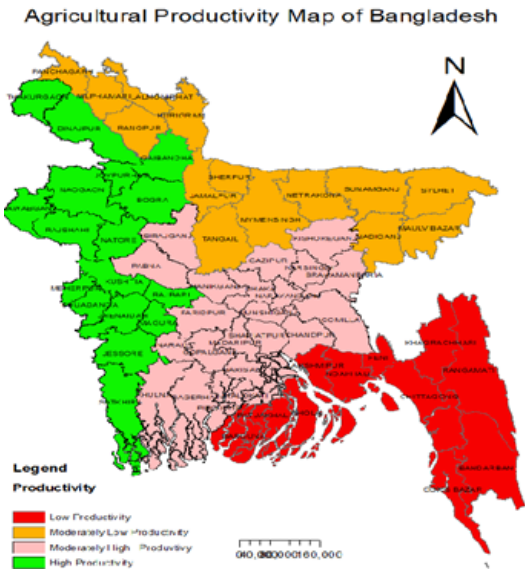


Figure 4. Agricultural Productivity Map of Bangladesh

The Agricultural productivity map of Bangladesh is given in Fig. 4 which indicates the different regions of the country having high or low productivity.



Bhutan: In Bhutan, 5130 km^2 area is under agricultural sector. Alfalfa performs best in dry climates on deep, well drained, loamy soil with a pH of 6.5-7. It is cultivated with ultimate fresh biomass yield (MT) 2.26 ± 1.02 and dry matter yield (MT) of 0.59 ± 0.27 respectively. Most utilized variety is Yuvika alfalfa. The descriptors of its seed are (Length 15, width 10, height 8, and weight 200g). Annually, the center (National Research and Development Center for Animal Nutrition, Bumthang) supplies around 23 MT of fodder seeds and 180 MT of oat and fodder maize seeds for improved pasture and winter fodder development in Bhutan. Alfalfa is utilized as pasture-based feeding, forage and processed into leaf meals (dried crumbs and powder) for consumption as protein source and Timothy Hay for small animals and pets. In 2019, the average tariff for Bhutan in Lucerne (alfalfa) meal and pellets was 48.9%. The countries with the highest import tariffs for Lucerne (alfalfa) meal and pellets were Angola (Most Favoured Nation duty rate treatement, 50%), Burundi (Most Favoured Nation duty rate treatement, 50%), Benin (Most Favoured Nation duty rate treatement, 50%), Burkina Faso (Most Favoured Nation duty rate treatement, 50%), and Botswana (Most Favoured Nation duty rate treatement, 50%).

Figure 5. Export Values of Iran alfalfa seeds

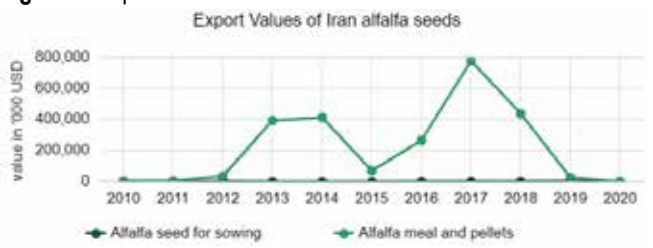
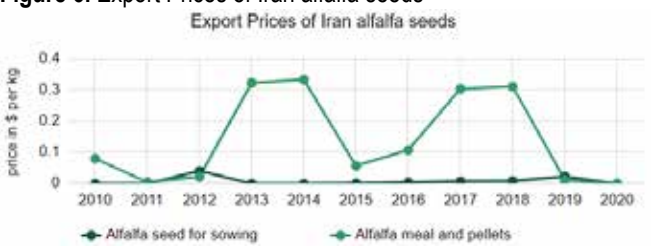


Figure 6. Export Prices of Iran alfalfa seeds



Iran: In Iran, total cultivated area by crops, orchards and vegetables is 14,448,101 ha, irrigated area is 8,447,010 ha (58%) and rainfed area is 6,001,091 ha (42%). Crop production takes place on 11,319,360 ha of which is 5,695,046 ha is irrigated (50%) and 5,624,314 ha is rainfed. Alfalfa is grown on an area of 620985 (ha) with production 5.46 (MT)

and yield 8851 (kg/ha). Alfalfa is majorly used for grain and silage purposes. Iran exports alfalfa seeds to United Arab Emirates (UAE), Iraq, Kuwait, Oman and Qatar. The total values in export for alfalfa seeds in Iran were US$ 2,822, US$ 8,233, US$ 4,645 and US$ 338 in US dollar thousand for the years 2016, 2017, 2018 and 2019 in that order. Iran's best performing export markets for alfalfa seeds are Iraq, Estonia, United Arab Emirates (UAE), Qatar and Oman. Iran brought in 521 tonnes of alfalfa seeds in 2019.

Figure 7. World Map, Iran alfalfa exports

Sri Lanka: In Sri Lanka, out of total area (65610 km^2), agricultural land is about 28116 km^2. The developing island nation of Sri Lanka employs about a third of its citizens in agriculture, with agricultural land use taking up close to 42 percent of the country's total land area. However, these numbers only produce a little over 8 percent share for agriculture in the country's overall GDP. Implementation of the Global Strategy in Sri Lanka is 33.7% employed in agriculture, 41.8% land area devoted to agriculture and 8% share of agriculture in GDP. Recently, a project (Improvement of agricultural production and productivity in dry zone areas) is being implemented which supplies imported seed of alfalfa (60 units of 20 kg) to farmers in the target area, and revolve the seed for expansion of the activities. Alfalfa is observed as long-lived, very deep rooted (perennial nature) with a depth of 5 to 6 feet by the first season and 10-12 feet by the end of the second year, and may ultimately extend to a depth of 20 feet or more. The production value of Alfalfa during 2021-2022 was 7.2-9.2 MUSD with an average increase of 27.80%, however, Alfalfa consumption of 28.6 to 30.9 thousand Tonns with an increase of 8.10% in Sri Lanka was observed in 2022. It could grow in dry areas and give enough nutrition to the livestock. Alfalfa is used as hay, silage, pasture (together with other forage grasses plants) and dehydrated flour or pellet as protein concentrate for cattle. The aim is the promotion of alfalfa and micro silage to improve the availability of the feeds. The statistics of Alfalfa production and consumption in the country are given in the Fig. 8 and 9.

The crop suitability map of Sri Lanka is given in Fig. 10 showing the suitable crops to different regions of the crops.

Afghanistan: The global alfalfa market is projected to grow from $21.63 billion in 2021 to $35.20 billion in 2028 at a CAGR of 7.2% in forecast period, 2021-2028. In 2019 Afghanistan exported 19,392 tonnes of alfalfa seeds. For 2019 alone, the demand for Afghanistan alfalfa seeds (seeds and seedlings category) has escalated, with a change of 35.874 percent compared to the year 2018. The prices of alfalfa seeds in Afghanistan per tonne for the years 2016, 2017, 2018 and 2019 were US$ 1,691.22, US$ 1,105.85, US$ 787.00 and US$ 1,408.42 in that order. In 2022, the approximate price

Figure 8. Production Value (Million USD) of Sri Lanka

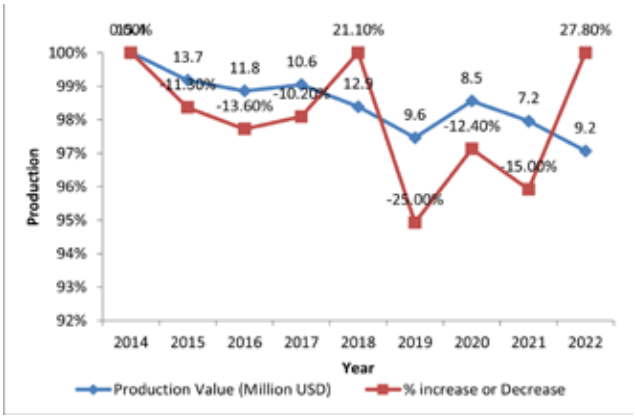


Figure 9. Consumption Value (thousand Tons) of Sri Lanka

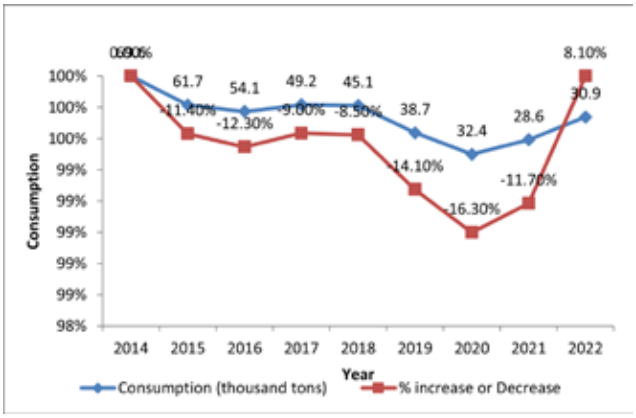
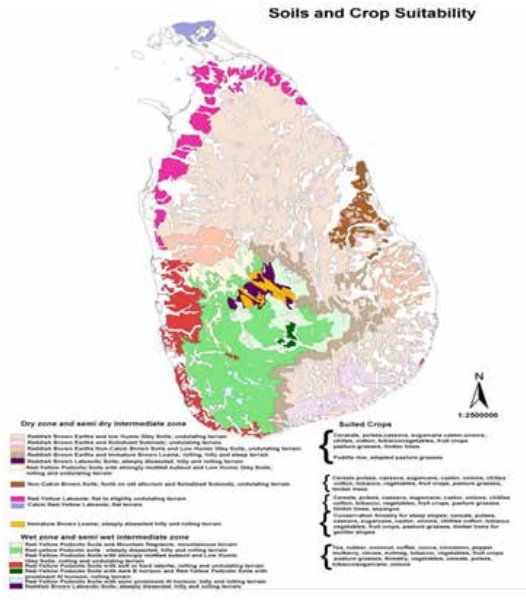


Figure 10. Crop suitability map of Sri Lankav



range for Afghanistan Alfalfa seeds is between US$ 1.41 and US$ 0.79 per kilogram or between US$ 0.64 and US$ 0.36 per pound (lb). Afghanistan's leading destinations for alfalfa seeds are United Arab Emirates (UAE). Common uses include green chop or hay for cattle, horses, sheep, goats and direct grazing for beef and dairy.

Figure 11. Alfalfa Seed (export value of Afghanistan Alfalfa seed)

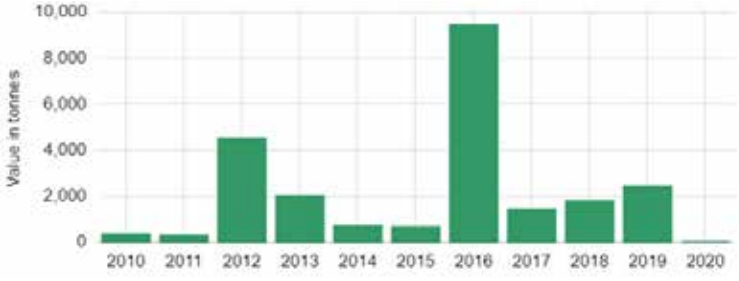
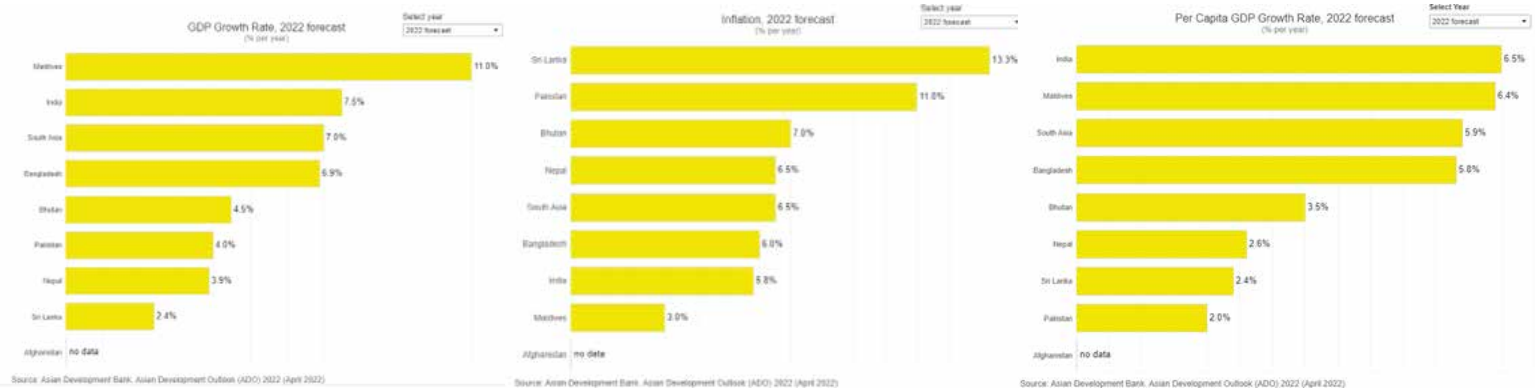


Figure 12. Alfalfa Seed (export price of Afghanistan Alfalfa seed)

Nepal: Out of the total 147,181 km^2 land area of Nepal, agricultural land is 28.75 percent (of which 21 percent is cultivated and 7 percent uncultivated); forest area is about 40 percent and pasture covers 12 percent. Other land occupies 28.68 percent of total area. Settlement and wetland, on the other hand, cover 1.15 percent and 1.22 percent of the total area, respectively. Out of the total arable land in Nepal, Terai and Hill occupy around 56 percent and 36 percent respectively. The Mountain region (above 3,000 meter mean sea level) where most of the barren land is found (83.59 percent) has less scope of agricultural land use intensification mainly due to rugged topography and climatic conditions. But the scope of agricultural land use intensification is more in Terai and Hill due to plain topography and suitable climatic condition for farming. Paddy, maize, and wheat are the major cereal crops grown in Nepal. The fodders are not really commercial in that region. Despite tree fodders (Artocarpus lakoocha, Ficus semicordata, Thysanolena maxima and Ficus calvata) are alternatively used as good sources of protein during the forage and green grass scarcity periods especially in dry season.

Maldives: The Maldivian economy is based on tourism and fishing. Of the Maldives' 1,191 islands, only 200 are inhabited. The GDP growth rate was 18%, out of which agriculture contributes (16%), Industry (7%), and services (77%). Out of the total 297.8 km^2 land area of Maldives, agricultural land is 79 km^2. Poor soil and scarce arable land have historically limited agriculture to a few subsistence crops, such as coconut, banana, breadfruit, papayas, mangoes, taro, betel, chilies, sweet potatoes, and onions. Almost all food, including staples, has to be imported (Maldives Economy). The agricultural sector of Maldives is based primarily on coconuts and other tree crops with only some 4 000 hectares under other agriculture crops (FAO, 2011). In response to the current food and fuel crisis, Maldives is integrating food security into national planning.

GDP growth rate, inflation and per capita GDP growth rate of South Asian Countries (2022)



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